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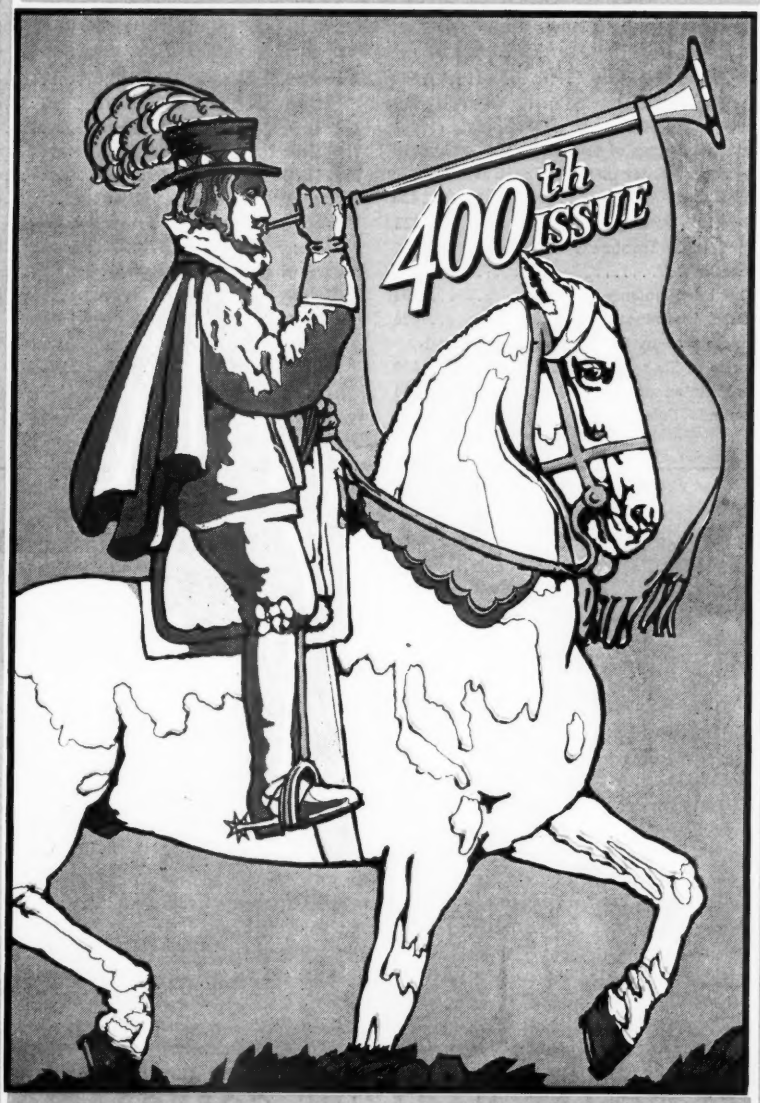
VETERINARY MEDICINE



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JULY 1939

VETERINARY MEDICINE

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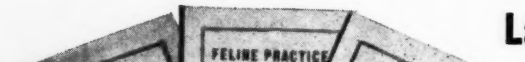

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D. M. CAMPBELL, *Editor*
7632 S. Crandon Ave., Chicago, Ill.
Telephone South Shore 7160

H. J. MOSTYN, *Eastern Representative*
1265 Broadway, New York, N. Y.
Telephone Murray Hill 4-4037

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The 400th Number

To the producers or consumers, the writers or readers of a magazine, the 400th issue is not likely to be distinguished from those that immediately precede or follow it unless special attention is centered upon it. However, it may be of interest to give thought from time to time to individual parts of the parade. After 15 or 20 or 25 years of getting a magazine into the mails every month the issues seem to follow one another in an unending file and with astonishing rapidity. This continuous parade around the calendar tends to promote routine where flexibility should prevail; hence it may be advantageous at times to look about with a view to checking up, and appraising the situation.

Without technical periodicals no profession has ever made much progress. The discoveries and improvements made by the abler members remain unknown to the majority and a knowledge of them is apt to be lost with the passing of the discoverer. "Veterinary Military History of the United States" points out repeatedly the long period required for even the most important advances in the knowledge of veterinary science to become widely known before veterinary periodicals were generally read in this country and how rapid has been the wide adoption of improvements in veterinary practice since. In this connection it should not be forgotten that veterinary association meetings and veterinary conferences, in themselves important means of disseminating new information, are dependent for their existence upon the interest aroused by veterinary periodicals. Not only were such meetings impossible before there were veterinary journals but to this day veterinarians who do not read veterinary magazines do not attend veterinary meetings.

Until VETERINARY MEDICINE came into the field, no veterinary publication in this country had achieved anything like general distribution. Probably none had ever numbered among its subscribers as many as 15% of those for whom it was published and no veterinary house organ had lived for more than a few issues. Within 15 years of its founding, VETERINARY MEDICINE attained a circulation in excess of 75% of the total number of prospective subscribers in its field. It seems undeniable that such favor as this magazine has enjoyed for a third of a century has been due to its diligence in supplying its readers with information that they could use in their daily work, and furnishing it before, not after, the demand for such information had arisen. It goes without saying that the credit for the

interest which the pages of VETERINARY MEDICINE have held for its readers is due its contributors who have written those pages.

Instances of this effort to place new and useful information in the hands of its readers can be cited in nearly every one of the 400 issues of VETERINARY MEDICINE. A few examples will illustrate this constant endeavor. In the earliest issues the advantages of the use of the stomach tube were discussed month after month. This appliance was then unknown to more than a very few. It became, of course, routine equipment and has been the means of saving hundreds of thousands of cases of digestive disturbance. Twelve years before the federal-state tuberculosis program was launched this magazine was urging, editorially, the systematic tuberculin testing of all dairy cattle. At that time, the plan was generally thought to be chimerical because of the expense. By 1909, bacterin therapy was receiving much attention. It was more than a year before it reached other veterinary literature. By 1910, discussions of hog cholera and its prevention by vaccination were under way, although at the time the idea that swine should be included among a veterinarian's patients was almost universally ridiculed. Soon a department of swine practice in the journal was inaugurated and continued for many years until swine practice became as standard for veterinarians as equine practice. In 1913 a department dealing exclusively with small animal practice was launched. Until that time, this type of practice had received little mention in veterinary literature. In time a textbook on "Canine Medicine and Surgery" was reprinted from this department. From the first issues much attention was given to live-stock poisoning, particularly to poisonous plants, and in 1917 this was expanded to a department which was continued for nearly a decade. It was unique in veterinary literature and still constitutes the principal repository of information on this subject. Soon after this a department on parasitology was deemed convenient for the rapidly accumulating discussions on this subject. It was the first, and for long the only such recognition of the importance of animal parasitisms. When, a decade ago, commercial dog food came to have an important bearing on veterinary practice, it was this magazine that, as usual, initiated a discussion of such foods which others, after four or five years, were able to take up.

Many of the therapeutic agents now or formerly in general use were introduced to or popularized among veterinarians, or both, by VETERINARY MEDICINE. Alkaloids, glucosides and other concentrates or refined drugs were little known or used by veterinarians when this magazine began discussing their advantages. Bacterins have already been mentioned, and arecoline, physostigmine, barium chloride, H. M. C., aconitine, lobeline, Dakin's solution, calcium gluconate, and many others are also included; and coming to newer agents, fuadin and other anthelmintics, including phenothiazine in this issue. This is a reminder of the regularity with which new discoveries have been announced first in these pages during the past third of a century, right down to chick embryo vaccine for equine encephalomyelitis last year, the description of B_1 deficiency in dogs last month, and a successful, new treatment for roundworms in sheep, in this issue.

All the happenings in the profession that are or were of general interest since almost the turn of the century are mirrored in the pages of VETERINARY MEDICINE, which constitute a voluminous record of the development of veterinary science during these fruitful years. The organization of associations, the proceedings of meetings, the enactment of practice laws, changes in matriculation requirements and in the curricula of the colleges, the gradual extension of veterinary medicine into the field of public health, the rapid progress in preventive veterinary medicine, every improvement in methods of diagnosis, surgery and therapeutics and much concerning the conditions surrounding veterinary practice, both as to its professional and business aspects, all are recorded in its pages, to-

gether with virtually a complete veterinary history of the World War. Percivall, a hundred years ago, compared the pages of veterinary periodicals to a safe wherein records are placed for future generations. The pages of VETERINARY MEDICINE bear this relation to the history of the veterinary profession in this country during the 20th century. A glimpse into this kaleidoscope reveals:

■ On the whole, the first decade of the 20th century was a prosperous one for veterinary practitioners. The number of horses and mules was steadily increasing and the quality improving. Improved cattle breeding was receiving far more attention than formerly, particularly with dairy cattle, and was furnishing a steadily increasing demand for veterinary service. The number of non-graduate practitioners was equal to the number of graduates in the older states, and greatly in excess in the newer. There were numberless localities where there were no graduate veterinarians, and competent men locating in such places could do enough practice from the first month to make a living; even second-year veterinary students were able, usually, to net sufficient from practice during the summer (six months) to pay a material part of their expenses at school the following winter (senior year). Other professions were far more crowded. The entrance requirement at most of the private schools was but common school education, and the course but three sessions of, at the most, six months each. Under such circumstances, a rapid increase in the number of young men, and many not so young, who decided to take up the study of veterinary medicine, was inevitable. For the first time there was a profit in operating a veterinary college, provided the students were satisfied with the course given; and most of them were far from critical. Even the poorest schools had graduates in the field who were enjoying a remunerative practice and all undergraduates were confident of doing as well, provided only they got diplomas. Although the number of veterinary schools was already ample for any conceivable need, additional institutions were organized. It was a golden opportunity to increase the facilities, lengthen the course, raise the entrance requirements, and improve the faculties of the existing schools; but there was no central authority nor influence to prescribe quality before quantity as the desideratum and there was no coöperation or even friendship between the schools; only bitter rivalry that invited rather than hindered the founding of unneeded institutions.

The public, which had long shirked its responsibility for training veterinarians, had, of recent years, come into the field, by establishing a number of state veterinary schools, but this had not improved the quality of the training. On the average, they had attracted a better educated class of students and their sessions were of eight or nine months, instead of five or six months, as was the case in the private schools. On the other hand, they were poorly supported financially and their faculties nowhere near the equal of the far better paid instructors in the private schools, nor was the clinical material available at the state schools adequate for even the mediocre training that was the order of the day in both classes of schools. Of course, the schools were not equally bad, but all, except a few small two-year schools, had the same recognition from the American Veterinary Medical Association and from the United States Department of Agriculture, which was employing several hundred veterinarians. That is, they had the same recognition officially, although actually at the middle of the decade, 40% of the veterinarians in the Bureau of Animal Industry were from a single school. The prospective veterinary student had little to aid him in the selection of a veterinary college. Then, without preliminary notice, the schools were all classified by the U. S. Department of Agriculture (1908). The Congress in 1906 enacted a new meat inspection law, which improved greatly and extended markedly the federal meat inspection, thereby requiring a materially larger number of veterinarians for this serv-

ice. In the same year the tick eradication in the 15 infested southern states was launched.

■ The second decade of the century was a prosperous one for veterinarians in practice, and brought substantial increases in the salaries of veterinarians in federal, state, municipal and industrial employment. The level of equine practice continued at the peak reached at the close of the preceding decade and when it appeared it might decline with the price of horses, the outbreak of the war in Europe sustained the latter and maintained equine practice until this country entered the war and 2,500 veterinarians entered the military service. Swine practice increased amazingly and cattle practice grew steadily during the 1910-15 era of good crops and good prices for farm produce. Small animal practice outgrew the joke stage and one was no longer expected to apologize for being engaged in it. Poultry practice was available but the opportunity to develop it was neglected. The enrollment in the 23 veterinary colleges then in existence increased until 1700 to 1800 graduates entered the profession in a single year.

Following the World War, veterinary matters were in a bad way. For the first time since the beginning of the century the veterinarian in the small town was less prosperous than the business men; for the first time his income fell to the level of that of the physician or lawyer. The public decided that the day of the horse was done and the work of the veterinarian over. The enrollment in the schools cascaded to that of the early 80's. Within the decade 1920-29, fewer veterinarians were graduated than in 1918 alone. Equine practice suddenly decreased at least 50% from the pre-war level and with the hard times in agriculture, dairy and swine practice also suffered. Many veterinarians who had gone into the army did not return to veterinary pursuits and all told, there was a rapid decrease in the number engaged in veterinary practice during the third decade of the century.

With 1930 came the business depression, which greatly decreased rural practice and increased the percentage of it for which veterinarians were not paid. Increased activity in tuberculosis eradication and the Bang's disease eradication project, to some extent, took up the slack for veterinarians; in fact, the Bureau of Animal Industry at one time had 2,360 veterinarians employed on a temporary status, or almost exactly the number commissioned in the army during the World War. But, during this period, particularly following 1933, small animal practice increased rapidly. The improvement in practice among farm animals of recent years is, of course, known to all. The outstanding veterinary event of the decade was the increased public interest in veterinary medicine and the consequent increased enrollment in the 10 veterinary colleges now operated in the United States and the two in Canada. For the first time in the history of veterinary education in this country the number of applicants for admission exceeded the capacity of the veterinary colleges for instruction and several hundred were denied admission yearly. The number of graduates yearly rose from a low point of 119 during the 20's to 500 at the close of the decade. The rapid development of small animal practice and the great federal-state disease control projects are probably wholly responsible for this increased public interest in veterinary medicine. Thirty years earlier this up-surge in public interest brought about the establishment of numerous new veterinary colleges. So far this time existing schools have taken advantage of it to increase their facilities and improve their faculties.

* * * *

Personal Messages of Congratulation and Tributes From Our Contemporaries

On the 20 succeeding pages of this the 400th issue of VETERINARY MEDICINE we have the privilege of publishing some of the messages from well-wishers prominent in our profession and from some of the most esteemed veterinary periodicals in this country and abroad which it has been our pleasure to receive in connection with the attainment by this journal of a third of a century of service to the veterinary profession.

Brought Credit and Distinction to the Veterinary Profession

It is a real pleasure to extend congratulations and felicitations to VETERINARY MEDICINE on the occasion of the publication of its 400th consecutive number.

R. A. Kelser

The highly important rôle played by a scientific journal in the welfare and development of the profession which it represents is universally recognized. In undertaking to present the work, accomplishments, requirements, etc., of a profession, a publication assumes a tremendous responsibility. This responsibility is even greater when the number of professional journals is small as is the case in the veterinary field. A journal's policies, articles, editorials, advertisements, etc., reflect favorably or unfavorably on the profession it purports to serve. In all of these VETERINARY MEDICINE has pursued a course which has brought credit and distinction to the veterinary profession. Those who have guided and shaped the destiny of VETERINARY MEDICINE have rendered a real service. Congratulations and best wishes for continued success.

R. A. KELSER,
Chief, Veterinary Division, U. S. Army.
Washington, D. C.

A Record in Veterinary Journalism

With a modest beginning under capable editorial management VETERINARY MEDICINE grew into popularity to reach a peak in subscriptions in 1920—a record in veterinary journalism. During the first decade, after 1908, this publication molded a pattern in veterinary journalism that was responsible for its many loyal supporters. Within this period, with VETERINARY MEDICINE and by means of books that he published, Editor Campbell influenced methods that were employed in practice in America, and thus made a distinct contribution to progress.

We congratulate Doctor Campbell upon his success, and we extend best wishes for VETERINARY MEDICINE's continued popularity.

J. V. LACROIX,
Editor, *North American Veterinarian*
Evanston, Ill.

The Results Are Worth While

A day will dawn some time in the future when the *Journal of the South African Veterinary Medical Association* will be able to celebrate its jubilee. On that occasion, the Editor will probably issue a special number devoted principally to early struggles, vicissitudes, and triumphs and without the slightest doubt will be able to point to the influence for good that the journal had, not only on the veterinary profession in South Africa, but throughout the world.

This day-dream, this hope of our journal, must express in a slight degree the feelings of Editor D. M. Campbell on the occasion of the issue of the 400th number of VETERINARY MEDICINE.

It would surprise us to learn that Campbell's editorship was always a bed of roses; no doubt he is sufficiently aware of the tribulations that appear to be portion of editors everywhere; but if such stimuli contrive to result in a so readable, instructive and, above everything, so sound a veterinary journal, the results are worth while.

M. STERNE,
Editor, Jn'l of the S.A.V.M.A.
Onderstepoort, South Africa.

Congratulations from B.A.I.

On this occasion of the 400th consecutive issue of VETERINARY MEDICINE, I extend my congratulations and felicitations to its capable editor, Dr. D. M. Campbell, and to his colleagues, contributors, and others who have participated in so noteworthy a journalistic marathon. Four hundred consecutive monthly issues signify the passing of 33 years— a generation as time is commonly reckoned. Within this period have occurred hundreds of veterinary conventions and other gatherings. Each has commonly dealt with reports of progress and plans for extending still further the scope of veterinary service and influence.

Important as such meetings have been and will continue to be, their value is further enhanced by veterinary journalism. This ally of the profession carries the message of speakers to distant readers and likewise provides a systematic and lasting record of events. When discussions, at times, wax hot or involve dissimilar views, veterinary journalism exerts a welding influence in obtaining a composite professional opinion. Moreover, the printed page is the medium through which research workers announce their findings to contemporaries throughout the world.

Within the period covered by the 400 issues of VETERINARY MEDICINE, the U. S. Bureau of Animal Industry has engaged in numerous functions authorized by the Congress of the United States. The effectiveness of such official efforts has depended materially on the training of employes provided by veterinary colleges and the coöperation of other veterinarians engaged in many fields of endeavor.

VETERINARY MEDICINE has actively and effectively sponsored such education and coöperation. Its pages have served as a forum of scientific discussion as well as being the medium of acquainting thousands of veterinarians with new developments of professional interest. Its editorial policies have been independent, constructive, and progressive. In short, besides being a valuable asset to the veterinary profession in general, this journal has rendered also a distinct public service through aiding the Bureau of Animal Industry in its endeavors to safeguard and develop the nation's livestock resources.

John R. Mohler

JOHN R. MOHLER,
Chief, Bureau of Animal Industry,
U. S. Department of Agriculture
Washington, D. C.

* * * *

A Message from the Veterinary Record

The publication of the 400th consecutive issue of VETERINARY MEDICINE marks an occasion not only in the history of our esteemed contemporary but in the history of American veterinary literarture.

Born in 1905 as the "Iowa-Nebraska Veterinary Bulletin" the early life of the journal was encompassed by difficulties and anxieties and indeed largely consisted in a struggle for existence; but it was soon to enter upon a continuous period of good fortune and this was coincident with the appointment of Dr. D. M. Campbell to its editorial and business management.

As a journal which made the needs and interests of the general veterinary practitioner its special care, VETERINARY MEDICINE has expanded in a truly remarkable way not only in its circulation but in its influ-

ence on veterinary science throughout the United States and Canada.

The value of VETERINARY MEDICINE as a medium by which new knowledge can be rapidly disseminated throughout so large a territory as the North American Continent has been well exemplified in the recently-published "Veterinary Military History of the United States" in which it is noted that, whereas a lag of 10 years occurred between the publication in 1897 of Schmidt's mammary inflation treatment of milk fever and its general adoption in American veterinary practice, the calcium treatment of Greig evolved in 1930 "was known to every veterinarian in the land and generally adopted within six months after its announcement."

The educative value of VETERINARY MEDICINE during the last three decades is incalculable and on this occasion of warm felicitation we would extend our sincere congratulations to its distinguished editor, for his journal is he.

H. W. STEELE BODGER,
Chairman, Editorial Committee, N.V.M.A.
London, England

* * * *

When Campbell Came to Town

Back in 1910, Chicago veterinarians became suddenly aware that a veterinary magazine had been implanted in their midst. Although they were pursuing the interminable labors of busy practitioners and teachers, the coming was as welcome to them as it was unexpected. The magazine came in the baggage of a young man we had known as the meat and milk inspector of Topeka, Kans., who for several years had been teaching Midwest veterinarians the habit of reading periodical literature.

The magazine was the *American Journal of Veterinary Medicine* and the newcomer was its editor, D. M. Campbell, who was seeking broader fields of action and influence—elbow room—for his undertaking.

The Chicago Veterinary Society, as it was then named, was 14 years old, two veterinary schools, flourishing in our growing city, were crammed with students and manned with large faculties. Practice was excellent although the fading of horses from the streets was already becoming apparent. Only one thing was lacking to make up the abundant life. We needed current literature to keep the mechanism of our enterprise in balance. Up to that time, doctors of veterinary medicine thirsting for professional literature had seen their journals leading a precarious existence, lacking definition of policy, popularity and regularity of arrival, and, naturally, a sufficient circulation to encourage their promoters.

L. A. Merillat

At once all this was reversed. We were soon receiving a monthly magazine on time, a magazine that was talking the language of applied veterinary science and laying down directions for bringing the loose ends of the profession into a workable unit. According to my personal adjudication of the events that have filed across the screen during 30 years of close acquaintance with its objectives, cultivating the habit of reading current literature by furnishing the first popular magazine of its kind in this country and pursuing a definite policy for the aggrandizement of the veterinary service in its various estates, should be set down in this 400th issue as the two crowning features of VETERINARY MEDICINE.

In those days of literary poverty (in kind and quantity), Campbell somehow satisfied our craving for popular reading material, material that not only concerned our daily task but also the sort that enriched the literature of our profession by encouraging the publication of the minutest details of classical research in understandable terms, that is to say, in terms that impressed the mind and remained there to serve the useful purpose of improving our graduate education. While medical science was ad-

vancing in leaps and bounds, VETERINARY MEDICINE was our graduate school. The university conferences and summer clinics lay in the distant future as much as they were

David Wirth

needed to homologize our heteromorphic ken. In short, Campbell's journal, as many called it, was for many years as much our graduate school as our forum for clinical reports. It kept us informed, alert, ambitious, and inspired us with courage to carry on in our classroom, clinical and association work. If VETERINARY MEDICINE became our Bible, it deserved the rating. Witness its mounting circulation to over 9,000, or practically universal, and the phenomenal development of the veterinary commercial laboratories from nothing to the big business class through the convincing argument that advertising pays.

But what is most outstanding and also most gratifying to me, though seemingly chauvinistic, is the fact that since Campbell came to town, Chicago has become the literary center of our branch of medicine as securely as it has become the literary center of human medicine.

What VETERINARY MEDICINE accomplished in the development of our profession can hardly be overstated. Its predecessors were too far away from the geographic center of animal production, and from the center of the veterinary population to seize the needs of each hour and marshal the profession to advantage. Lack of nationalism made their downfall inevitable, despite the herculean ardor of their lamented editors and, needless to add, it delayed the growth and influence of the veterinary service for a generation. "When Campbell Came to Town" was an important day.

L. A. MERILLAT
Executive Secretary, A.V.M.A.
Chicago, Ill.

* * * *

The Function and Responsibility of Veterinary Journalism

The veterinary journal has to render an essential service. This obligation imposes upon the editor and the publisher a certain duty toward the profession as well as toward the public in general.

Undoubtedly, the first task of a veterinary journal, being a professional journal, is to inform the reader continually about the newer developments in research and practice, as far as they refer to veterinary matters and animal breeding.

In this manner the journal keeps the individual veterinarian, wherever he may be located, in touch with the progress in veterinary science and practice. Thus, new experiments and theories quickly become common knowledge. It is, therefore, proper to state that in this fast-living age the professional journal provides the necessary continuation of education for the members of the profession.

"He who rests, rusts," says a German proverb. Applied to our profession, it means that he who does not subscribe to at least one veterinary journal to inform himself of the newer developments of his science, soon may find himself consigned to the rubbish heap, however young in years he may be.

Sometimes the reading of professional journals inspires the subscriber to wield the pen himself, and to communicate his own views and experiences; thus, he is taking part in the building-up process of veterinary progress.

While the textbook is merely a summary

of the knowledge existing at the time of its publication, the journal provides for the progressive development of this knowledge and of newer ideas.

I am well aware of the fact that the practitioner looks to his journal, above all, for articles from which he can make immediate application in his practice. This point of view deserves full recognition by the editor, but such articles must not appear to the exclusion of others.

If the veterinary profession is to continue upon its upward march, then its members must take definite part in other problems which are not immediately practical, but purely scientific. Sooner or later, however, the solution of these problems becomes applicable to conditions in practice.

As an academician, the veterinarian must stand upon a loftier plane than the empiricist; he must command a certain universal education in veterinary science.

Some of the veterinary journals have still another task to fulfil, which consists in the conveyance of mere personal news, that is, of non-professional activities. The idea is to arouse, maintain, and deepen the feeling of solidarity within the ranks of subscribing members, a feeling which of necessity must be present if the profession as such is to defend its interests for the good of its members.

But the professional journal should not convey only the events and achievements in its own country, but also those of other countries.

Therefore, beyond mere professional interest, the veterinary journal becomes a medium of international understanding.

Thus, everywhere the veterinary journal is the intermediary and advocate of progressive development of our profession.

In this sense, the appearance of the 400th issue of VETERINARY MEDICINE must be appraised as an effort extending over many years to lift the veterinary profession upward to the advantage of the individual veterinarian, the benefit of public health, and the promotion of political economy, in which by natural force he must be interested.

VETERINARY MEDICINE, therefore, is assured the approval and gratitude of all branches of veterinary science.

The best wishes for its future are, consequently, our wishes for the progress of the veterinary profession and the veterinary science.

DAVID WIRTH,
Editor, *Tierärztliche Monatsschrift.*
Vienna, Germany.

Portrays the Progress of Veterinary Medicine

When I learned recently that the July number of VETERINARY MEDICINE will represent the 400th consecutive issue, my eyes involuntarily shifted to my bookshelves and the many bound volumes of the journal found there. Farthest to the left was Volume V containing my first journal, Number 6, of that volume, the issue of September, 1910. This was the year of my graduation from college, likewise when my subscription began. Since that time, over a period of almost 29 years, my files have not been broken. Each monthly issue of what was originally the *American Journal of Veterinary Medicine* and later VETERINARY MEDICINE has been on my desk and routinely transferred to permanent indexed files as a part of my library. An examination of these files will show that they accurately portray the great changes and steady advances of professional veterinary medicine over more than the last three decades. During this time the veterinary profession has made its greatest progress and its scientific attainments and responsibilities have become generally recognized as of vital importance in the economic and social life of the country.

One of the earliest issues of VETERINARY MEDICINE describes itself as "a monthly journal of comparative medicine devoted to the best interests of the veterinary profession." Devotion to the best interests of the veterinary profession has certainly been the theme of this journal over these many years. Its pages each month present some appeal to all branches of the veterinary profession with special attempt to be of inter-

est and value to the private practitioners who represent 65% of the total veterinarians of the country. However, its voice is being constantly raised in the support of any smaller group in the profession, whose interests may be in jeopardy.

To you, Editor Campbell, the veterinary profession is indebted not only for the journal VETERINARY MEDICINE but for your many other contributions to veterinary literature and for the many occasions on which, with your pen, you have risen in the defense of various professional interests. In behalf of the veterinary profession of North America, I wish to felicitate you on the occasion of the issuance of the 400th consecutive number of VETERINARY MEDICINE, a fine professional journal which has so satisfactorily served the veterinary profession for a period of nearly 34 years.

H. D. BERGMAN,
Ames, Iowa President, A.V.M.A.

* * * *

Message From Annales de Médecine Vétérinaire

The Editorial Committee of the *Annales de Médecine Vétérinaire* is happy to join in the celebration of the 400th issue of VETERINARY MEDICINE. It presents to the editor, Doctor Campbell, and to his loyal collaborators, its warmest congratulations on this occasion.

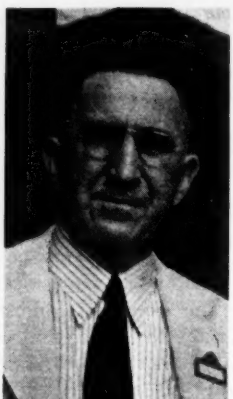
In insisting on the close connections between human and veterinary medicine and on the rôle played by the veterinarian in the hygiene and health of man; in bringing professional claims to the attention of public authorities; in completing the scientific education of its readers by the numerous articles on zoötechnics, hygiene, and animal diseases, VETERINARY MEDICINE has served the veterinary profession well in the course of more than 30 years of labor.

The Committee of the Annals of Veterinary Medicine offers its sincere wishes for an even more fruitful and prosperous future for this valuable magazine.

C. H. VAN GOIDSENHOVEN
Cureghem-Bruxelles, Belgium

Every Field of Veterinary Endeavor Influenced

VETERINARY MEDICINE reflects a generation of progress of the veterinary profession in the United States. It stands as a symbol of the life work of its editor, who has been instrumental in the journal's development from its beginning to one of our foremost veterinary periodicals.



R. J. Foster

It is both a pleasure and a privilege to congratulate Doctor Campbell on the part he has played in charting veterinary journalism through this formative period. It is difficult to estimate the great influence that journalism plays in the advancement of the profession, yet progress may be judged by a comparison of issues of VETERINARY MEDICINE from its inception to the present time. Every field of our endeavor has felt its guiding influence. It has always been a leader in championing the improvement of every branch of the profession. It reflects the growth and expansion of the practitioners' field, public health, research and military service.

As co-editor of the "Veterinary Military History of the United States," Doctor Campbell rendered an invaluable service to the country by thus making a permanent record of the part the profession has played in the military affairs of the nation.

I am sure that all veterinarians, and particularly those associated with the military services, whether in the Organized Reserve, National Guard or Regular Army, are appreciative of the ideals and principles for which VETERINARY MEDICINE has always stood and wish its editor many more years of continued success.

R. J. FOSTER,
San Francisco, Calif. Col. V.C., U.S.A.

Approved the High Standard

I feel it an honor and pleasure to have a part in commemorating the 400th number of VETERINARY MEDICINE. It seems but yesterday, rather than a third of a century ago that its publication began though I have read nearly all of the four hundred numbers since, and have noted the advances in each succeeding issue.

J. A. Campbell

Since the birth of VETERINARY MEDICINE our profession has seen more profound changes than any other profession. All reflected by, and in many cases initiated by articles appearing in VETERINARY MEDICINE have included a broadening of the scope of the profession. In the issue of August, 1910, which I have before me as I write, the articles are concerned almost exclusively with the horse; now small animals and the food producing animals take their proper place. At that time veterinary literature, apart from a few textbooks, was confined to the large animals, especially the horse. VETERINARY MEDICINE, realizing the needs of those interested in small animal practice, initiated the movement toward the broader field by publishing a series of excellent articles on the diseases and treatment of dogs and cats. Those articles by a fellow practitioner here in Toronto providing as they did, sound information, expressed clearly, concisely and forcibly, were of great value to the busy practitioner, and served to stimulate greater interest in the widening scope of veterinary practice. They were but the forerunner of many that have followed on this branch of veterinary medicine.

Being somewhat concerned in military matters, I have appreciated the efforts of VETERINARY MEDICINE on behalf of the Veterinary Officers of the United States Army. I feel that these efforts have been largely instrumental in establishing these officers and their profession with the rank and prestige they so justly enjoy.

It is gratifying to the Canadian members of the profession to find a spirit of coöperation and mutual good-will fostered on every occasion by VETERINARY MEDICINE across our international border.

J. L. Axby

The editorial staff merits the warmest congratulations from all its readers on the high standard of science and ethics maintained throughout these years. I am sure I can speak for us all in wishing for VETERINARY MEDICINE and its staff long continued success.

J. A. CAMPBELL

Toronto, Ont.

* * * *

Well Wishes from U. S. L. S. S. A.

In all sincerity, I extend my congratulations to the editor on the 400th consecutive issue of VETERINARY MEDICINE. I have watched it grow from birth to its splendid stature of today—in which, in a comparative way, it may have an equal but has never had a superior.

The field of usefulness for veterinary science is wide in scope and complex in nature, and any magazine adequate to the diversified conditions of livestock sanitation and disease prevention and control has an herculean task.

To me it appears self-evident that agriculture is the basic industry of the land, and that the livestock industry is the keystone of the arch of agriculture. Without careful sanitary supervision and authoritative regulation of the livestock industry it will perish, and a perishing livestock industry is rapidly followed by decline of civilization.

VETERINARY MEDICINE has continually and consistently spread the gospel of organized veterinary science, and if I could have my way about it, it would be a regular visitor to every veterinarian's office and fireside. None can afford to keep it a stranger, but

all can benefit from its beneficent influence to cover an area so vast that it would reach from the rising sun to the judgment day.

On behalf of the United States Live Stock Sanitary Association and all Indiana veterinarians, may I wish the staff of VETERINARY MEDICINE even greater success and the happiness found only in a job well done.

J. L. AXBY,
State Veterinarian,
President, United States Live Stock Sanitary Association
Indianapolis, Ind.

Ever Helpful to the Practitioner

Congratulations to VETERINARY MEDICINE on its long and successful service to the profession. I have followed it through the years. Editor Campbell recognized from the first the need for a good practical journal and concentrated his efforts to the serving of every branch of the profession.

Especially has this journal been helpful to the general practitioner. The many case reports it has published and the many articles by practitioners in the field, have helped bring about better conditions and understanding. The special numbers of VETERINARY MEDICINE on the diseases of the different breeds of animals, constitute an invaluable file for future reference.

Since the beginning of this magazine, many developments, outstanding in the field of practice and science, have come about. Through the years of its existence, we have seen changes brought about in the advancement of our profession.

Standards of education have been raised by all colleges. The large number of private schools that existed at that time, have passed out of existence and are only history now. They served well in their day and were stepping stones in the advancement of a great profession.

VETERINARY MEDICINE had a large influence on the betterment of conditions, in establishing higher and closer understanding between all branches of the profession. The many meetings covered by the editor, the pictures of veterinarians appearing in the journal, promote good feeling and closer acquaintanceship among the members of the profession.

I wish for VETERINARY MEDICINE many more successful years.

T. A. SIGLER
Greencastle, Ind.

An Accurate Resumé of Veterinary Matters

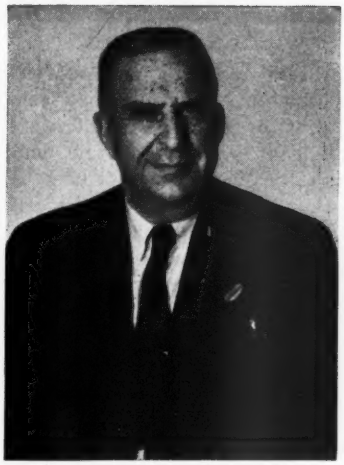
I am one of those who for more than a quarter of a century have been enjoying and profiting by the monthly visits of VETERINARY MEDICINE, which I know has been truly helpful to the man who needs it most — the practitioner.

T. A. Sigler

It is only fair to say that the editor has been blessed with just the right ability, judgment and energy to give to the profession an accurate and interesting resumé of veterinary matters in general—the human twist and mental stimulus so essential to many who have struggled under so much misinformation of the past.

VETERINARY MEDICINE has always carried a balanced proportion of scientific data in a condensed form, so attractively put, that the busy practitioner could glean enough to make him want more; yes, in some cases even awakening the drone and the sluggard. The editorials have been fearless when necessary, and always fair. The magazine has been distinctly national, with no place for shriveled sectionalism and party prejudices.

I think that we who are congratulating the editor on the occasion of the 400th issue of his magazine may add a personal touch, so to speak, because we in the audience often hear the other fellow's side. While criticisms are sometimes constructive, they are too often petty. At times, I have been concerned about the attitude of certain members of the veterinary profession toward the work of others. In my own case, I probably never should have



W. J. Butler

been a veterinarian had it not been for the horse and the dog. I was literally foolish about them from childhood, but I am not so narrow as to overlook the wonderful work that can be and is being done in other fields of veterinary endeavor. We who have to do with race tracks and show rings know how ridiculously unfair and prejudiced horsemen and cattle men can be, but we expect veterinarians to be above that. It is fortunate that there are so many phases to the work of the profession. It makes opportunities for those of different talents—"many men of many minds."

Having contributed to the pages of VETERINARY MEDICINE many articles on large animal problems, I know by the number of letters that I have received from colleagues of the great interest and care with which it is read. I also know that many articles on subjects with which I have had little to do are interesting to me.

To even enumerate the valuable features of the magazine, much less catalog its services would extend this message beyond the limits of propriety, but in closing, I must not forget to especially mention the opportunity that has been given young men, that is veterinary students, to report cases that are assigned to them at our college clinics. That is just fine. It's good for the boys and it's good for us.

So, here's to the magazine and its founder whose genius has adorned its pages and whose personality has endeared it to thousands of readers throughout the land.

Goshen, N. Y. J. F. DE VINE.

* * * *

Live-stock Regulatory Work

Live-stock regulatory work requires not only a thorough knowledge of veterinary medicine, but in addition an understanding of the live-stock industry.

Live-stock sanitary officials must have the loyal support and the confidence of the live-stock industry. They must also have the loyal support and must utilize the services of the practicing veterinarian. It is also essential that they have under their direction a convenient and properly equipped diagnostic laboratory.

Veterinary medicine no longer deals solely with diseases of live-stock solely of economic importance to the individual stock-grower. The veterinary profession and particularly the regulatory officer must combat and control disease of live-stock that are transmissible to the human family.

In "live-stock" we include domestic animals, dogs, cats, poultry and wild animals.

In the control of live-stock diseases we consider it desirable to divide the state into

J. F. DeVine

geographic districts with a full time, salaried, graduate veterinarian in charge of each district. It is his duty to coöperate

J. G. Horning

with private practitioners and to investigate a report of an infectious-contagious disease among domestic or wild animals and to take immediate action for its eradication or control in accordance with uniform regulations and methods of procedure and quarantine restrictions promulgated by the sanitary board or the supervising regulatory officer.

The production and distribution of milk and cream should come under the jurisdiction of the veterinary profession. Too long have we neglected the importance of the proper sanitary supervision of the production of milk. In many instances that duty has been delegated to those with no technical knowledge of milk production and little if any knowledge of sanitary requirements.

We have been negligent in our study of nutrition. The proper food requirement of the animal body and nutrition as a factor in disease will never be understood until the trained scientist versed in anatomy, physiology and pathology determines the food requirement for the proper functioning of the endocrine glands and other body organs.

W. J. Butler,
State Veterinary Surgeon.
Helena, Mont.

Veterinary Education—Formal and Informal

Veterinary activities constitute a great social function. As such, they command the interest of society. This interest should be intelligent, sympathetic, and helpful as well as critical. One does not need to press the point that a worthwhile social professional service is possible only where there is adequate machinery for training a personnel. There is machinery for this purpose in the United States, but by no stretch of the imagination can it be considered adequate. The efforts of some of the American veterinary colleges to maintain a decent existence and render a satisfactory service are pathetic but commendable in that they reflect a noble human trait——always make bricks without straw, if you must have bricks, even if you haven't any straw.

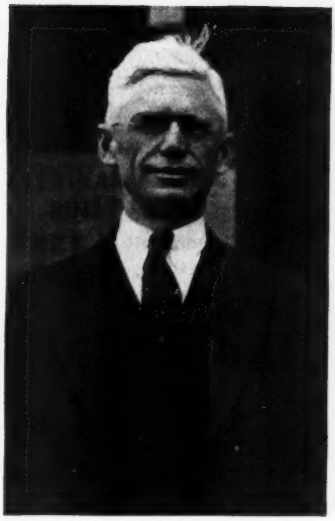
Veterinary education is experiencing—not enjoying—one of those rarely recurring manifestations of intense (pathological?) interest in its services on the part of a public conspicuously noted for its persistent and seemingly studied lack of interest, if not contempt, for all things veterinary. Support for veterinary education from whatever source, be it governmental, federal or state; be it philanthropic, individual or corporate; be it private, tuition or student fees; whatever it may be, it is niggardly or it simply doesn't exist. Consequently, if, when, and as veterinary education develops in America it should be a healthy and a sturdy growth, certainly no hothouse plant.

Formal veterinary education, as represented by what the student does to the curriculum, is legally a prerequisite to any informal or extra-mural studies. The responsibility of the veterinary college, dear old Alma Mater, is twofold, she must train her children so that they meet the numerous and ever-increasing institutionally imposed curricular demands and, also, that they can and will continue to meet the self-imposed, extra-curricular demands for study and self-development that characterize all truly professional careers. If the pic-

ture of formal veterinary education is not as cheerful as either we on the inside or you on the outside would like to have it, we can all unite enthusiastically and sincerely in praise of our American veterinary periodical literature. Our output of veterinary textbooks is neither quantitatively nor qualitatively what we have a right to hope for, but our periodical contributions are excellent in respect to all their features. This is a phenomenon deserving an adequate explanation. My dear old Professor—later Dean—Veranus A. Moore used to say that "Books are graveyards." The living are to be found in the current periodicals. It is hoped and expected that the very much alive VETERINARY MEDICINE will still be one of our Professors of Informal Veterinary Medicine after 400 more issues have come from the press.

WARD GILTNER

East Lansing, Mich.



Ward Giltner

Felicitation from India

We extend our cordial greetings to the editor and publisher of VETERINARY MEDICINE — our esteemed colleague in the New World—on the completion of the 400th consecutive issue of the magazine. It is a great pleasure to us who are also in the field of veterinary journalism to note the progress of American veterinary journalism as reflected in its pages. The crisply worded articles in the magazine, brightly illustrated with clear photographs, provide its readers with a widely varied fare of highly interesting and instructive information. Problems of animal husbandry and genetics, reports of bacteriological and pathological findings, problems of animal nutrition and records of clinical cases have all received well merited attention; equally important has been the attention paid to the different branches of veterinary practice. We in other lands can vision the progress of veterinary medicine in America in the pages of VETERINARY MEDICINE.

It is a great achievement to have successfully conducted such a monthly veterinary magazine for the last 400 months and we, therefore, heartily congratulate our contemporary on its successful efforts, and sincerely wish the magazine and its capable staff continued success and prosperity in future years.

P. SRINIVASA RAO, G.M.V.C.
Editor *The Indian Veterinary Journal.*
Madras, India.

Personification of Its Editor

My sincere appreciation is extended to VETERINARY MEDICINE and to its editor for the wonderful work they have done for the veterinarians and the veterinary profession the past 34 years. The material it has presented has covered the entire field of our profession. By its perusal one has been kept well informed and up to the minute with all things that concern us. To me VETERINARY MEDICINE has always seemed the personification of its founder and publisher, Dr. D. M. Campbell, and I am honored to have had their intimate acquaintance for the past 26 years. Those associated with Doctor Campbell in establishing this outstanding record in veterinary journalism also deserve their full share of credit. The contributors have not only been from the *Who's Who* of American and international

veterinary fame but also any veterinarian who had a worth-while message for the profession. In inducing students of the various schools to write for the magazine Doctor Campbell presented much good material and many fresh viewpoints for us who have been in the "grind" for a number of years and at the same time offered those who will take our places an encouragement and a training that may have a far-reaching effect in the years to come. In fact at all times VETERINARY MEDICINE has been preëminent in its field. Our profession can well be proud of its editor and his associates for VETERINARY MEDICINE. We wish it continued progress for another 400 issues.

J. GILBERT HORNING.

Houston, Texas.

* * * *

We Are on Our Way and We Know Where We Are Going

THE profession of veterinary medicine is orienting, and judged by other professional standards, we may be charged with exceeding the speed limits.

The bible begins with a garden and ends with a city. The veterinary profession in this country began with a fleam and the signs of the zodiac, and the end is in the haven of our dreams. The days since swaddling clothes is scarcely more than 50 years. There are a few of us of diaper days still living and trying to adjust ourselves to the regalia of adolescence.

From the standpoint of the infinitude of time 50 years are but "a flash of the lightning, a break of the waves" but in the course of a human life they represent the *summum bonum* of opportunity, and according to Osler, ten years of borrowed time. This period in the veterinary medical profession is marked with achievements that presage a future of accomplishment which should intrigue the admiration and respect of mankind everywhere.

Surely no one can accuse us of having been "asleep at the switch." From ox cart and daguerreotype, to "stream-lined" trains and the cinema; from horse dentistry, "wolf in the tail," and "holler-horn," to conservation of the animal wealth and the public health; from magic to scientific demonstration; from superstition to faith in an orderly universe; from the classic

G. H. Glover

demonstration of Smith and Kilborne to the rôle of small animal life in the transmission of pestilential diseases. Indeed we might go on indefinitely and always find that comparisons are not odious but enlightening.

Our research laboratories are ever enlarging the scope of diseases transmissible from animals to man. Means of effective control have followed in the wake of vectors and a knowledge of their individual characteristics in establishing their action.

The period of expectancy of life has been extended a quarter of a century since the days of Law and Liautard. Thanks be to the science of medical research, and veterinary medicine has done its share.

Throughout the United States most municipalities of over 3,000 population have food supervision with a veterinarian in charge. Those with federal meat inspection, and the activities of the United States Public Health Service, have given us the safest and most wholesome food of any nation on earth.

Veterinary practitioners are dedicating their lives to restoring ailing animals to health and educating the public in the care of animals and the prevention of disease.

I am not sure that there is anyone who has done more to promote the cause

of veterinary medicine than Campbell through the instrumentality of VETERINARY MEDICINE. No man has given more loyal support to our beloved profession.

Our educational program is on a sound basis. We have profited by the unhappy experiences of our sister profession. We have no cheap side-show veterinary colleges trying to ape the standards of the big tent. The pedagogic pendulum swings to extremes but at last must come to rest at the "golden mean."

At first anatomy was at the bat for nine innings and the *how of things* occupied the center mound for the full session. Now the *why of things* is curving the ball for three-fifths of the five year curriculum. We want a good foundation but we also want a superstructure pretentious enough to hold a bath tub. Farmers and stockmen want results.

"Time renders ancient good uncouth," but we oldsters made the best use of the light we had—which was not very much. "On with the dance."

GEO. H. GLOVER

Ft. Collins, Colo.

Contributes to a Better Veterinary Service

It is a mark of unusual achievement that VETERINARY MEDICINE celebrates with this issue the 400th consecutive appearance to the veterinary profession. My heartiest congratulations and best wishes are extended together with the hope that it may continue its period of useful service for another 400 issues of the same high standard that has characterized its entire existence.

It is always considered a mark of achievement when any one can join the ranks of *The* 400. Admission to that select company usually results from rank in some important group, social standing, wealth, or "pull."

VETERINARY MEDICINE has established its own *rank* by aggressive and progressive efforts in behalf of the veterinary profession and the livestock industry. It enjoys the best *social position* in things veterinary since it can boast such a large number of loyal subscribers. Whatever of *wealth* it possesses has been gained by earnest effort and honest business dealing with those whom it serves. Its standing as a professional journal has not resulted from "pull," but rather from push.

VETERINARY MEDICINE has recognized an opportunity to render service to the profession of which it is a part, and this service has been of such high order and so important throughout the years that a large percentage of veterinarians have become loyal supporters.

J. S. Koen

The selection of material for publication has been timely, the quantity adequate, the quality unexcelled, the arrangement well-balanced. Large numbers of subscribers representing all groups of veterinary activity are the best evidence of the satisfactory service it has rendered. Proof of these subscriptions, should any one doubt, is to be found in the liberal patronage by advertisers. That VETERINARY MEDICINE does have a *pull* is manifest by analysis of advertisements in each issue. Space for advertising purposes is used only when it brings returns of a material nature.

Culturally, VETERINARY MEDICINE supplies the mental food required by any member of the profession. Scientifically, it presents the best material available in a practical manner at a time it will be most helpful. Materially, it offers those who serve the profession in a commercial way a broad field over which may be displayed their products and their services. Finally, through all these channels it brings to the owners of livestock a better veterinary service than otherwise could be possible.

The achievement of VETERINARY MEDICINE in reaching this 400th issue has been due to the untiring efforts, the ability, and the sincerity of purpose of the editor, my friend, classmate, and colleague, Dr. D. M. Campbell.

JOHN S. KOEN

Storm Lake, Ia.

Discussed All Developments in Its Field

When I learned of the coming 400th number of VETERINARY MEDICINE it provoked some personal reflections. As my memory serves, I have read 300 of those issues. Thus for 25 years I have enjoyed the magazine and greatly profited thereby. It has told of the scientific disclosures in that period in understandable language. Current developments in no field has escaped the scrutiny of its editor. The presentation of many field cases as observed and treated by colleagues has greatly interested and benefited me.

S. L. Stewart

It has been said that we practitioners are the backbone of the profession. I choose to think of us as being a link in the chain that constitutes the veterinary régime. We practitioners were trained by a corps of educators, our knowledge is the bequest of scientific research and our armamentarium is supplied by highly specialized commercialists. Thus equipped with training and supplies and fortified from time to time with research findings we serve as one of the factors that link the veterinary profession to the general public. The chain lengthens and becomes more intricate with the passing years. We must keep abreast of the developments in a rapidly moving profession. For this we depend, largely, on personal and group contacts and on current reading.

Journalists, through the periodical visitations of their magazines, are endowed with a lion's share of opportunity for influencing and guiding the thinking of practitioner readers. Your job, Mr. Editor, is one of responsibility to the well-being of the profession, an important link in the chain that hitches the practitioner to his educational, research and commercial confrères and thence to the live-stock industry and the general public.

I congratulate you, Editor Campbell, on the occasion of the 400th number. May your successes of the past augment your future usefulness and may the coming years add to the laurels you have so abundantly earned.

Mt. Vernon, Iowa. John B. Bryant.

* * * *

Alertness Never Wanting

On the occasion of the 400th issue of VETERINARY MEDICINE it gives me the greatest of pleasure to express my unquestioned belief that by continuous hard work and untiring effort for the upbuilding of the veterinary profession the editor of this magazine is in a class by himself. VETERINARY MEDICINE has been to me the most valuable of veterinary journals; valuable to general practitioners and valuable to others in the profession.

History reveals that the veterinary profession was functioning in the old world in 2100 B. C. It entered the field in America during the Civil War, but during the period in which Doctor Campbell has edited 400 issues of VETERINARY MEDICINE it has made a far greater progress than in all the 4,000 years before, and VETERINARY MEDICINE has done its full share in bringing about that advancement.

Publishing a successful magazine during a time of such amazing progress required a high degree of alertness that was never wanting in the management of VETERINARY MEDICINE. This alertness and capacity to meet changing conditions has been no surprise to me. Nearly four decades ago, I enrolled in the same freshman class as did the editor and often during our college course "approaching events cast their shadows before." Of all that class of 80 students, the prize was easily his for foresightedness and also for sustained application to the task in hand. It is my wish that Doctor Campbell's remaining years may be as fruitful for the veterinary profession as the past 35 years have been.

S. L. STEWART,

Olathe, Kans.

Most Useful for the Busy Practitioner

The editorial staff of VETERINARY MEDICINE is to be congratulated for their very interesting as well as educational publication of the veterinary profession. I have a copy of every issue since Volume V, 1910,

A. T. Kinsley

and I consider it one of the most valuable journals in my library. There is scarcely a day or week that I do not refer to some article, or articles in my journals. There is no magazine, to my mind, that has done more for the busy practitioner than yours.

Your publication has always been very concise and exact in the printing of all worthy papers that have been sent to your office for publication, and I am sure as long as the policies of the present editorial staff are carried out, it will continue a publication of much interest to veterinarians at large.

I feel that every issue has had the veterinary profession as a whole at heart, and is in sympathy with its work from a practitioner's point of view, as well as an educational magazine. I only hope that VETERINARY MEDICINE may continue for 400 more consecutive issues, but probably none of us old practitioners will have the pleasure of reading its pages for that time, as we have in the past.

Congratulations on your past worthy work, and God-speed in its continuation.

S. E. HERSHEY

Charleston, W. Va.

Always First in the Veterinary Field

It is not only a pleasure but also a privilege to record some of the achievements incident to the 400 issues of VETERINARY MEDICINE. More than 30 years ago, the far-sighted founders of this journal recognized its possibilities, if properly conducted, in advancing the veterinary profession in America, and thus better serving the livestock industry and the general public.

Every phase of the veterinary profession and the adopted policies has been reflected in the various and diversified discussions, illustrations and editorials of this journal. Of course the limitations of space and time prohibit more than a mere mention of a very few of the important factors concerning American veterinary journalism over a period of 33 crowded years. It has been interesting to note in the past few years interesting clinical reports from numerous veterinary students. This is an excellent training for these students in careful observation. They become potential factors in the future production of veterinary literature. This policy, although probably unnoted by many, may have far-reaching effects. I expect that it will.

S. E. Hershey

Many years ago, VETERINARY MEDICINE recognized the possibility of hog cholera vaccination becoming one of the most important future functions of the veterinary profession in the cornbelt. Thus, the administrative technique in the vaccination of hogs against cholera, including approved methods of handling serum and virus, was extensively discussed for years, as a policy on hog cholera. Today cholera immunization is efficient and relatively uniform as is the production of potent serum and virulent virus. Furthering this policy, this journal has persistently contended that hog cholera will not be suppressed in this country until the distribution of virus to other than competent veterinarians is prohibited.

What has been said and done relative to

the hog cholera policy during the last 25 years is equally applicable to the established policies in the control of other diseases.

The control and eradication of tuberculosis was a major project that was championed by VETERINARY MEDICINE for some 20 years. When many were deprecating the use of the intradermal tuberculin test and officially refusing to recognize it, this journal boldly stated that adhering to the external test constituted a misappropriation of public funds. When officialdom proclaimed that the tuberculosis eradication project could be carried out successfully only by whole time employes this journal proclaimed that no worthwhile progress would be made until the testing was turned over to practitioners and again circumstances validated the statement.

A. T. KINSLEY

Kansas City, Mo.

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Always Scientific and Practical

Please accept congratulations, Editor Campbell, on the wonderful accomplishments of VETERINARY MEDICINE during 400 months of publication. During all this time I have been more or less closely in touch with your magazine and I have learned many useful things from its pages. In fact it has constituted for me through the years a never failing post-graduate course in veterinary medicine. Its pages have always carried discussions of scientific and practical value, to the veterinarian. The perusal of these articles and clinical reports have enabled many members of the profession to render better, more intelligent and more efficient service in all lines of professional veterinary activities.

Education goes on forever. The collection and dissemination of valuable information through the pages of VETERINARY MEDICINE have resulted in the passing on to farmers and live-stock owners generally, and to others more or less closely connected with the control and eradication of animal plagues and diseases transmissible to people, information valuable to all and there is no doubt that this constituted a very large factor in making this country a better place in which to live and to gain a livelihood.

Thank you, Doctor Campbell and associates, for your hearty spirit of coöperation and the aid you have rendered to the veterinary profession. My wish is that you may continue your good work through many more years of usefulness.

Athens, Ga. W. M. BURSON.

* * * *

Veterinary Journalism

The part that veterinary journalism has played in veterinary practice in the United States is far beyond the comprehension of any one person.

Because of a great lack of preparation of some of the graduates of the older veterinary schools, there arose a necessity for more clinical data for the members of the profession so that they could keep apace with the rapid developments of medicine. The veterinary journals have been in front in disseminating much of this newer knowledge which has made the practice of veterinary medicine and surgery so successful.

The man who has been a consistent reader of journals devoted to the practice of veterinary medicine is the practitioner who is up-to-date and capable of rendering the service expected or required of him. Point to the man who never reads veterinary publications and you will find a man who is using methods long discontinued and one prone to criticise the profession for its lack of opportunities.

In the problems more closely allied to agriculture than to medicine, veterinary publications have pointed the way in which the practitioner can hope to cope with the more intricate problems of practice. Publications have been a fountain of knowledge of recent years concerning the deficiencies of diets. They have pointed out to the profession that unless practitioners give more thought to mineral and vitamin deficiencies, they will be less successful in the practice of medicine and surgery.

During the years when many of the problems of practice arose because of the rapid

increase of animal population, veterinary journals were the source of information whereby practitioners gained a knowledge of the clinical experience of neighboring colleagues. The editors collected the facts from different groups of practitioners and passed the information to the whole profession. There were no other sources from which the veterinarians could obtain such knowledge except through a great financial sacrifice.

As veterinary journalism grows, so does the knowledge of the members of the profession grow. Information thus gained through reading makes for greater proficiency in animal disease control.

E. C. W. SCHUBEL

Blissfield, Mich.

* * * *

Local Veterinary Service Essential to Disease Control

Fifty-six years ago there gathered in Washington, D. C., a representative group of cattle breeders and feeders for the purpose of discussing with officials of the Treasury Cattle Commission ways and means of inducing the Congress to take prompt action in the control and eradication of the cattle plague known as contagious pleuropneumonia.

In a letter directed to the *Breeders Gazette* in March, 1883, by the Honorable L. S. Coffin, president of the Iowa Improved Stock Breeders' Association, concerning this convention we find:

> There is more to this question than seems at first sight. The time has come for plain words and decisive action. Beyond all question, there is no class of men in this nation that are more broadly intelligent, level-headed, and have clearer conceptions of what is just and fair, than the class of men who are engaged in the stock-breeding and feeding interest.
>
> We, as cattle men, with the carrying interest of the nation, must come together and consult, and give to the world our wish and our will. This matter must be delayed no longer. Already we begin to fear that we are too late. If, as it is reported, the plague has already crossed the Allegheny mountains and found a lodgement in the herds of West Virginia and Ohio, the most heroic treatment must be resorted to. State laws must take hold of the matter, even to the temporary infringement, if need be, of interstate rights and commerce, until the Congress meets again.

Out of the meeting of cattle men with the Treasury Cattle Commission in Washington there was created in 1884 what we know today as the United States Bureau of Animal Industry, established for the purpose of carrying on coöperative work with the several states in the control and eradication of contagious, infectious and communicable diseases affecting the livestock industry.

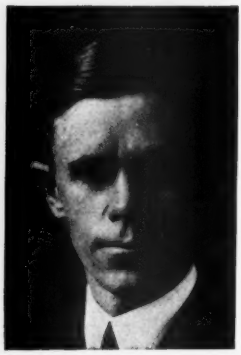
In 1887, Congress appropriated funds for the eradication of the plague contagious pleuropneumonia; and, under the able direction of Dr. D. E. Salmon, first Chief of the Bureau, in coöperation with state livestock sanitary officials, the disease was finally eradicated in 1891 from the United States.

After completing this task, the Bureau turned its attention towards losses occurring in Northern cattle that came in contact with cattle from the southern states. Many of the northern and western states passed sanitary laws regulating the shipping of southern cattle into them. The Bureau assigned Doctors Smith and Kilborne, and later Doctor Cooper, to the task of clearing up this problem. As a result of their remarkable discovery, that the splenetic fever is transmitted through the medium of the southern cattle tick, quarantine lines were promptly established and livestock sanitary control work had reached the second stage of its journey.

As veterinary science advanced in our country, keeping pace with the rapid development in agriculture, many veterinarians established themselves in country practice, thus forming the nucleus of the state livestock sanitary forces, which, in coöperation with the United States Bureau of Animal Industry, proved to be the most efficient organization in the control of livestock diseases that has ever been established in any man's country.

The fourth stage or change affecting the control of livestock diseases took place following the World War: As we developed our splendid system of highways, the automo-

tive industry keeping pace with highway development, the transportation of livestock *via* truck followed, and quarantine lines at



C. M. Haring

state borders began to vanish. It was during this period that we find great advancement in the development of biological products for the control and prevention of contagious and infectious diseases. Educational programs were conducted by Federal and state institutions, attempting to educate the laymen in the use of these products. This was followed by commercial concerns who saw a fertile field for their products through such channels. Today, the state livestock sanitary officials in most states are confronted with a serious problem, perhaps greater than that which confronted their predecessors 50 years ago.

The well-trained, practicing veterinarian is the keystone around which the most effective, efficient and economic disease control measures may be constructed. Fortunate, indeed, is the state livestock sanitary official who has available to him a large number of astute, efficient, graduate, practicing veterinarians located at various points in every county of his state. With such a setup, backed or supported with enforceable laws, rules and regulations, the state, in coöperation with the United States Bureau of Animal Industry, can effectively control and eradicate diseases of livestock, whenever such diseases threaten to become a menace to the livestock industry in any community.

H. E. CURRY,
Jefferson City, Mo. State Veterinarian

Factors Fundamental to Efficient Veterinary Service

Efficient veterinary service is based largely on two factors: (1) specialized knowledge of animals and their diseases and (2) skill in the application of this knowledge to the needs of animal owners or to the requirements of the milk and meat industries and the public health. It is, therefore, apparent that efficiency in veterinary service will increase directly in proportion to the development of new knowledge and its application to real needs. Credit for recent improvements in veterinary service is due to a multitude of workers whose results have been published and thus become available to all who depend on medical and surgical science. Such contributions to knowledge may be the result of years of experience and trial by a practitioner or groups of practitioners who are not only skilled but who are scientific enough to make the new knowledge available and useful to others. Coöperation between practitioners and research workers has recently yielded excellent results. For example, the discovery of effective means of protection against equine encephalomyelitis was based on knowledge developed by workers in at least three universities, the Rockefeller Institute, the War Department, the United States Bureau of Animal Industry, several commercial biological laboratories, and numerous coöperative veterinary practitioners.

By the building up of new knowledge concerning animal diseases, medical scientists are meeting the greatest present need of the veterinary profession: a better body of information on which to base practice. An estimate of how effectively the profession as a whole in North America is availing itself of advances in veterinary science could be determined by a survey of the subscription lists of the leading veterinary periodicals. No one is worthy of the title of veterinarian who fails to enrich his knowledge in his special field by constant reading. The editor and founder of VETERINARY MEDICINE has attained the distinction of having provided 400 issues, each of which

has contributed to available knowledge in veterinary science and practice.

C. M. HARING

Berkeley, Calif.

* * * *

The Veterinary Profession in North Carolina

From the earliest days of the colony of North Carolina through the beginning of statehood and continuing into the twentieth century its people have had to reckon with disease among live-stock. In 1795 a law was enacted by the State Legislature providing that:

> No person shall hereafter drive any cattle from those parts of this state where the soil is sandy and the natural production or growth of timber is the long leaf pine, into or through any of the highland parts of the state where the soil or growth of timber is of a different kind, between the first day of April and the first day of November in any year, under the penalty of four dollars for each and every head of cattle so driven, to be recovered and applied as before mentioned.

This, no doubt, referred to the devitalizing and deadly disease of tick fever of cattle. So far as is known, this is the first law pertaining to animal diseases enacted in the United States.

Again in 1836 the State Legislature enacted a statute to prevent driving cattle into this state from either South Carolina or Georgia between April 1st and November 1st.

In 1878, 52 years ago, Dr. D. E. Salmon of the U. S. Department of Agriculture, who later became the first chief of the Bureau of Animal Industry, came to North Carolina to investigate hog cholera. Previous to 1890 there were no college-trained veterinarians permanently located in North Carolina. North Carolina State College of Agriculture has had many prominent veterinarians connected with it from 1893 up to the present, as has the Veterinary Division of the North Carolina Department of Agriculture, who have always had the advancement of the profession and the interests of the practitioners at heart.

February 26, 1892, three-fourths of the State of North Carolina was quarantined on account of cattle ticks. Much of the experimental work of tick eradication was done by the U. S. Bureau of Animal Industry in this state. Actual eradication began

A. A. Husman

in 1906 in coöperation with the state and was completed in 1925 after 19 years of hard labor. This work paved the way for the importation of better breeding stock and made the live-stock owners veterinary-conscious thereby inducing graduate veterinarians to locate in clean areas and establish themselves in practice.

The next veterinary activity established in the state, the U. S. Bureau of Animal Industry and the state coöperating, was hog cholera control in 1914. This work did not accomplish the results expected of it, and while it demonstrated the efficacy of the use of serum and virus, it led to the promiscuous use of this product by many who were not qualified to use it properly, with the result that the hog cholera situation is seriously in need of a revised field program.

The next official veterinary activity established in this state, the U. S. Bureau of Animal Industry and the state coöperating, was bovine tuberculosis eradication which was in 1917. Area testing was started in 1922 and a modified accredited status for the entire state was reached October 1, 1928. North Carolina was the first state in the Union to reach that goal.

Bang's disease work was started in 1934 and is in progress at the present time.

The above is a brief outline of Federal Bureau and state activities. These projects have been subject to frequent criticism on the part of those who feel that they deprive the practitioner of a portion of the revenue he is entitled to in his community. Fortunately, the practicing veterinarians of this state are now convinced that the volume of testing for both tuberculosis and

E. J. Frick

Bang's disease that they are doing at present would never have reached the proportions it has but for these programs. There is at present complete harmony among the practitioners and the Bureau, state, city and county veterinarians, which has enabled the profession to advance its cause before the public.

When one considers there were not five graduate licensed practitioners in this state in 1895 and the first association was formed in 1902, and at present there are 82 graduate, licensed practitioners, seven graduates on the state veterinarian's staff, eleven on county and city boards of health, it must be admitted that the veterinary profession has made remarkable progress in this state in the period that has elapsed since the first issue of VETERINARY MEDICINE reached its readers, and as a reader who has long been familiar with it I can say that the changes in the magazine have been equally revolutionary. This is just another way of saying VETERINARY MEDICINE has always been abreast of veterinary progress and never static. With other thousands of its readers I congratulate its editor and contributors with having rendered the veterinary profession an outstanding, a remarkable service of incalculable value during a third of a century.

A. A. HUSMAN,
President, North Carolina V.M.A.
Raleigh, N. C.

Progress on the Printed Page

For a third of a century VETERINARY MEDICINE has been helping the busy practitioner keep abreast of the latest and best knowledge. Here we find Progress first placed on the printed page. Likewise, the opportunity given senior students in the veterinary colleges to publish clinical reports is valuable training for future practitioners. It is a pleasure to congratulate and pay tribute to the editor; to acclaim his efforts, to salute him, author, editor and educator, and to hope he continues to carry the torch of professional enlightenment for many years.

E. J. FRICK
Manhattan, Kans.

Particularly Suited to the Needs of the Practitioner

We have always regarded the pages of VETERINARY MEDICINE as particularly suited to the needs of the practitioner.

As one of this group, we appreciate this viewpoint, and we have not missed an issue of VETERINARY MEDICINE in over 25 years.

May it continue to serve us in the future as well as it has in the past.

E. T. BAKER
Moscow, Idaho.

From France and Belgium

The article on scrapie immediately following, sent us by M. Marcel Petit, editor of the *Revue de Médecine Vétérinaire,* was written by two of the regular collaborators of that journal especially for this issue of VETERINARY MEDICINE.

Another excellent article, by Prof. Goffinet, a member of the faculty of the veterinary school at Cureghem-Bruxelles, Belgium, was contributed by Prof. Van Goidsenhoven on behalf of the editorial committee of the *Annales de Médecine Vétérinaire,* a message from whom appears elsewhere in this issue. This article, dealing with the use of citrated chloral for equine anesthesia, will be published in the near future.

Investigations of Scrapie in Sheep

By JEAN CUILLE and PAUL-LOUIS CHELLE, Toulouse, France
L'Ecole Nationale Vétérinaire de Toulouse

SCRAPIE (*la tremblante, Traberkrankheit*) is a disease peculiar to the ovine species, which is prevalent only in certain regions of Europe: Germany, Great Britain (in shires situated on the border of England and Scotland) and France (in the provinces of Tarn, Aveyron, and Cantal).

The disease manifests itself in sensory-motor symptoms; fright, trembling of the head like that of old age, grinding the teeth, an intense pruritus which begins in the lumbar region, then extends over the entire body, and finally difficulty in walking (locomotor ataxia localized at first in the hind quarters, affecting next the fore quarters, and ending in total paralysis). The disease is non-febrile; its course is slow, lasting two to four months. It invariably terminates in death. In infected herds, the annual losses often represent 20% of the total.

The lesions are those of a polioencephalomyelitis (I. Bertand, H. Carré, and Lucam[1]). They consist of a degeneration of the cortex accompanied by a neurological reaction and by some area of perivascularity. Stockman[2] has reported the existence of inclusions in the cells of the motor columns of the spinal cord.

The etiology of scrapie is not well-known. A multitude of factors have been incriminated; a hereditary degenerative process; alimentary disturbance (undernourishment or intoxication), parasites in the muscles (*Sarcocystis tenella*). Observation seems to indicate that the disease is contagious, but attempts to transmit it by inoculation or demonstrate an infective agent have failed.

It was our opinion that the failure of inoculation to produce the disease could have been due either to insufficient virulence in the material used (blood, spinal fluid, etc.; very seldom has nerve substance been used), or to an observation period that was too short. The animals had never been observed longer than six months; often much less. Now, it seems, according to the observations of English veterinarians, and notably of Stockman[3], MacFadyean[4], and Gaiger[5], that under natural conditions, the incubation period is at least 18 months.

Further experiments have confirmed this hypothesis.[6] Eight animals, brought from an unaffected region, were inoculated in different ways (intracerebrally, epidurally, intraocularly, or subcutaneously) with an emulsion of the cord or of the brain tissue of diseased animals. Five of these, after a period ranging from one to two years, developed the characteristic symptoms of the disease and died. The three others remained healthy during the experimental period (two years).

Scrapie in sheep is, therefore, an infectious disease, transmissible experimentally by the intracerebral, epidural, intraocular, or subcutaneous inoculation of nerve substance (cord or brain), after an incubation period of one or two years. The length of the incubation period appears to be conditioned to a certain degree by the method of inoculation; it is shorter when inoculation is into the brain or the epidural space (one year), and longer in the case of intraocular injection (15 months) or subcutaneous injection (20 months). It is even possible that in certain more resistant animals the incubation period is longer than two years, which would explain the failure of the three animals inoculated with the same material and in the same manner as the others to contract the disease within that period.

Scrapie is not inoculable into the rabbit. However, the goat, which does not contract the disease naturally, has been infected experimentally.[7] In the goat, the disease is manifested only by motor difficulties (trembling of the head, progressive paralysis), without the pruritus noticeable in the case of sheep. Also, in the goat the incubation period is longer (25 months following intraocular inoculation, as contrasted with an average of 18 months in sheep), and the course is somewhat retarded (four

months instead of two or three).

We have been able to show, finally, that the virus of scrapie will pass through the Chamberland filter L_3. The filtration does not appreciably diminish the activity of the infective material.[8]

The method of natural transmission is not yet fully understood.

Sheep-breeders and many veterinarians[5] consider the disease to be hereditary, being transmitted by either the sire or dam; and it is true that in infected herds, the lambs of infected ewes frequently contract the disease at the age of 18 months or two years. This, however, does not presuppose a prenatal infection; it could be argued, with some logic, that the infection could have taken place after birth.

We have tried[9] to verify this hypothesis (1) by removing lambs from infected dams at birth, and raising them either on the bottle or with healthy ewes. Three lambs have been raised thus; none of these has shown any signs of infection during a two-year observation period. (2) By having three healthy ewes served by a ram inoculated with scrapie, during the incubation period of the disease. The three lambs were still healthy at the age of two years.

It has not been possible, therefore, to demonstrate that scrapie is hereditary; our experiments, however, have been too few to permit conclusive denial of a hereditary factor.

Scrapie is contagious. If infected animals, either male or female, are introduced into a herd, the infection is communicated to the other animals. However, because of the length of the incubation period, the first cases do not appear for 18 months or two years.

How does the contagion spread? It is generally thought, following the negative experiments of Damman (1869), Besnoit (1899), MacFadyean (1918)[4], etc., that the disease is not transmitted by simple herding together. It is thought that infection occurs at the time of coitus; the male is infected when covering a diseased ewe, and subsequently transmits the disease to healthy ewes.

In our experiments, we have not been able to infect ewes by having them covered by a ram in the incubation stage of scrapie or by one which had covered and impregnated an infected ewe toward the end of the incubation period. On the other hand, we have succeeded in infecting healthy females by prolonged proximity to diseased ewes, the disease appearing 18 months to two years after the beginning of the experiment. However, of the six animals thus exposed, only four became infected. It has not been possible to determine the reason for the non-infection of the others.

Summary and Conclusions

These experiments show that:

1. Scrapie is an infectious disease.

2. It is transmissible to the sheep and to the goat by intracerebral, epidural, intraocular, or subcutaneous inoculation with nerve substance (cord or brain tissue).

3. The incubation period of the experimentally-induced disease is one to two years.

4. The virus passes through the Chamberland filter L_3.

5. It has not been possible to demonstrate the hereditary transmission of the disease.

6. Scrapie can be transmitted without coitus by continued proximity of young animals to infected sheep.

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Memphis Meeting of the A.V.M.A.

A CITY with a past rich in historic lore will greet visitors to the 1939 A.V.M.A. Convention, to be held Aug. 28-Sept. 1. Although a modern, bustling city, Memphis presents a varied picture of colorful legend and tradition—a picture full of events associated with the earliest explorations by white men in America, and with the development of our western civilization.

The aboriginal inhabitants of this territory have left their traces in the great ceremonial mounds which were their burial places. Later the powerful Chickasaw tribe roamed this section, and when the first white men came, Memphis was the site of the fortress of Chisca, their chief, and of their principal village.

H. W. Jakeman, Chairman of the Executive Board of the A.V.M.A.

It was in May, 1541, that Hernando DeSoto stood on these bluffs and looked on the Mississippi River—the first white man to view the mighty Father of Waters. DeSoto claimed the great valley for Spain. Later it passed into the hands of France, by whom it was ceded to England. Following the Revolutionary War, the territory came into the possession of the United States, and in June, 1796, it was taken into the Union as part of the State of Tennessee. Later the Spanish erected a fort on the peninsula formed by the junction of Wolf River and the Mississippi, now in Memphis' manufacturing district, and sought to take possession of the Memphis territory; they abandoned this attempt, however, on the arrival of Captain Isaac Guion, first American commander to assume control of the Chickasaw bluffs. Captain Guion built Fort Adams, which rapidly grew to be an important trading post.

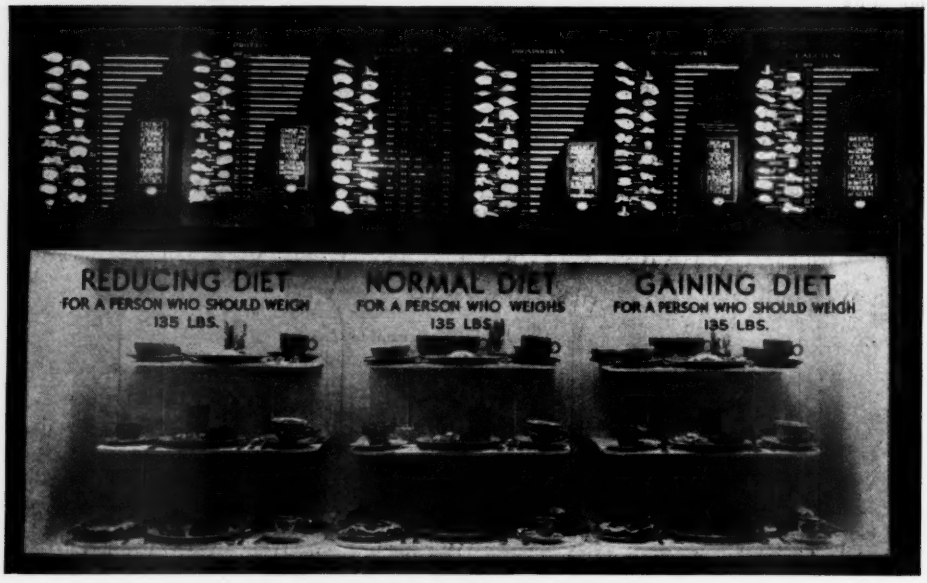
In 1861 Memphis pledged fealty to the Stars and Bars of the Confederacy, but following a gunboat battle on the river front, the Federal forces under General William T. Sherman took command of the city. It was during the Federal occupancy that the gallant Confederate cavalry leader, Nathan Bedford Forrest, made his daring night raid on the city, in connection with which he gave his famous prescription for military victory—"to get there fustest with de mostest men."

It was the year following the War Between the States that the historical race between the *Natchez* and the *Robert E. Lee* took place. There are still steamboat men in Memphis who can tell of that memorable encounter, in which the *Robert E. Lee* was the victor, running from New Orleans to St. Louis in the record time of three days, 18 hours, and 14 minutes.

In writing of Memphis, one must also tell of Beale Street, where the blues began, when W. C. Handy, the Negro musician, wrote his "Memphis Blues," "Beale Street Blues," and "St. Louis Blues." Actually, Beale is a ragged little street, cutting an ugly gulch through downtown Memphis and ending up in the Mississippi. The old cobblestones have been replaced with asphalt, and neon lights tell of pool halls and beauty parlors. But you can still smell the charcoal that John Mills uses in barbecuing pork, and on a warm summer afternoon there is the lush fragrance of ripe watermelon and the greasy odor of fried catfish on sale at the One Minute Lunch, while Yancey's Jug Band stomps out a jungle-like rhythm.

The "World of Tomorrow"

Veterinary Exhibit at New York World's Fair



THIS WILL ATTRACT THE LADIES
The diet section of the meat display of the veterinary exhibit at the exposition. Food values are explained in detail in the charts above the diet displays

THE veterinary science exhibit, utilizing pictures, charts, dioramas, and electrical displays to portray the conquest of animal disease and the importance of veterinary medicine to human welfare, is one of the most colorful in the Medical and Public Health Building at the New York World's Fair. The keynote of the exhibit is struck by the motto lettered on the rear wall: "Veterinary Science Protects Public and Animal Health." The various portions of the exhibit, sponsored by individual associations and firms, show graphically different phases of veterinary science's contributions to animal and human welfare.

The first unit, labeled "Insects Carry Disease," displays on a rotating cylinder large models of five insects: the body louse, rat flea, cattle tick, house fly, and malaria mosquito, and explains the disease each carries. The veterinary discovery of the manner in which tick fever is spread and the importance of this discovery are depicted. The war against tick fever is illustrated by maps of the United States showing quarantined areas.

The next display is devoted to the thesis that only healthy cows can produce safe and wholesome milk. The measures in use against bovine tuberculosis, Bang's disease and mastitis are described. The successful campaign against bovine tuberculosis is featured by a device in which flashing green and red lights show the great reduction in this disease between 1924 and 1938.

Equine encephalomyelitis next receives attention. A picture of a horse affected with this malady is contrasted with that of a healthy animal; maps show the incidence of the disease during the past five years. The transmissibility of the virus to man is pointed out, and the efficiency of the chick

embryo vaccine in controlling the disease is demonstrated.

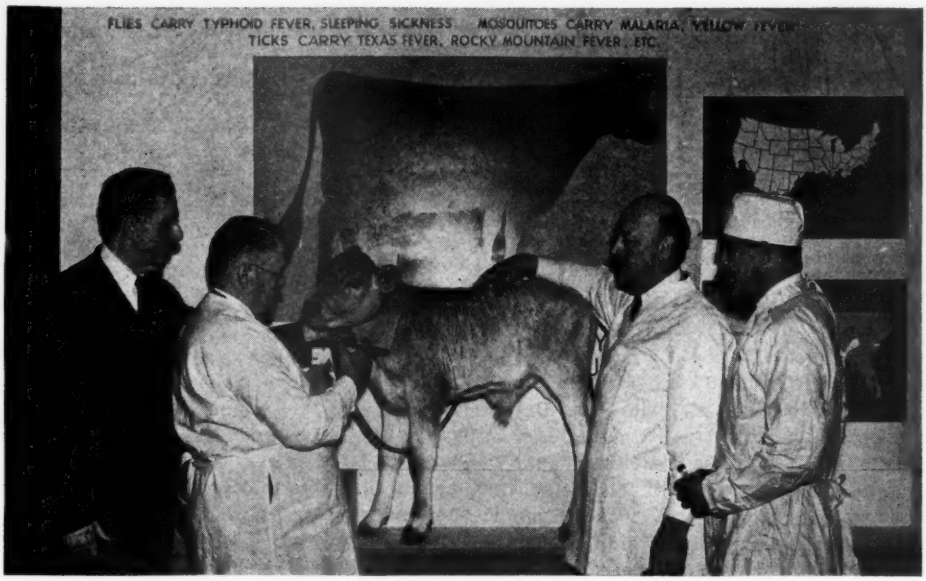
Next, the details of a modern veterinary hospital for small animals are shown by means of a photodiorama. All the modern facilities for diagnosis and therapy are depicted, and a moving device shows different breeds of dogs in sickness and health.

The conquest of veterinary science over hog cholera is next signalized. The declining losses from this disease following the application of preventive immunization are shown pictorially and graphically.

The final feature of the display deals with the inspection of meat and suggestions as to its use in the balanced diet. The thoroughness and economy of federal meat inspection are portrayed, a series of lighted circles being used to show the relatively small cost to the public of safe meat. The booth shown in the illustration is part of this display. A reducing diet, a normal diet, and a gaining diet, with meat properly utilized in each, are displayed, and charts above explain in detail the necessary facts about calories, protein, vitamins, and the mineral constituents of the diet.

The exhibit was formally dedicated Friday, May 19, with an impressive ceremony at which Dr. John R. Mohler, chief of the Bureau of Animal Industry of the U. S. Department of Agriculture, was guest of honor and principal speaker. A luncheon at which several speakers paid tribute to the veterinary profession marked the beginning of the dedicatory ceremony. Appropriately enough, several animals were present to take part in the proceedings: a Belgian mare, a Russian wolfhound, a dachshund, a donkey, and "World's Fair," a calf born at the Fair ten days previously.

The exhibit has attracted a good share of attention, and is a worthy testimonial to the major part which veterinary science plays today, as well as an indication of its place in the "World of Tomorrow."


FLIES CARRY TYPHOID FEVER, SLEEPING SICKNESS
MOSQUITOES CARRY MALARIA, YELLOW FEVER
TICKS CARRY TEXAS FEVER, ROCKY MOUNTAIN FEVER, ETC.

A CALF INOCULATION

Arthur G. Hall, veterinarian of The Borden Company, inoculates "World's Fair," a ten-day-old calf born at the Fair, as Cassius Way, president-elect of the A.V.M.A., John R. Mohler, chief of the Bureau of Animal Industry of the U. S. Department of Agriculture, and C. P. Zepp, practitioner, New York City, look on. Doctor Mohler, as chairman of the arrangements committee, was responsible for bringing the exhibit to completion. He was guest of honor at the dedication ceremony, and chief speaker at the luncheon which commenced the proceedings. In his talk he stressed the contributions of veterinary science to human welfare and praised the veterinary profession for its zeal in carrying out the work entrusted to them.

7th World's Poultry Congress at

THE World's Poultry Congress, which meets every third year, will be held this year in Cleveland, Ohio, July 28 to August 7, 1939. This is the first time the congress has met in the United States, and it will probably be many years before this country again is host to the 60-odd nations represented.

During the 11 days of the Congress, there will be a continuous and interlocking schedule of meetings dealing with every phase of the poultry industry—meetings for the poultry raiser, dealing with poultry culture and marketing, for the processor, for the handler and marketer of poultry products, and for the consumer, with demonstrations illustrating new and economical ways of preparing poultry for consumption. Scientific papers from representatives of 21 nations will be presented. Elaborate exhibits from many nations have been planned. The United States exhibit, constructed at a cost of $35,000, will picture the government's interest and participation in the industry, the importance of poultry as an economic factor, and the manifold ramifications of the industry, while state exhibits from every state and territory will feature many of the local phases. Five main buildings, with 20 acres under roof, will house the Congress. There will be automobile parking facilities for over 200,000 cars.

CLIFF D. CARPENTER

Doctor Carpenter, pathologist in the Educational Department of Allied Mills, Inc., is chairman of A. V. M. A. Day at the Congress

Wednesday, August 2, has been designated A. V. M. A. day at the Congress. The following program has been outlined:

Morning.—Section 3, "Pathology and Disease Control," at which Doctors Brandly, Dobson, Rudolph, Baudette, Schaaf, and Coles, from Michigan, England, Germany, New Jersey, Germany and South Africa, respectively, will cover subjects including "The Use of Chicken Embryo in Poultry Disease Studies," "Newcastle Disease," "Treatment of Coryza and Tracheitis in Fowls with Chlorine Gas," "Respiratory Diseases of Birds," "Trichomonads as Excitants of Disease in Poultry," and "Pullorum Infection in Fowls."

Noon.—Luncheon meeting at the Hotel Carter, with expected attendance of 500 or more veterinarians.

Afternoon.—Special veterinary program, attendance being confined to veterinarians; the general theme will be "A Broad Treatment of the Problems in Poultry Practice." The speakers for this program have been tentatively selected, and their subject matter includes:

1. Today's preparation of the veterinary student for poultry practice.
2. Value of research in avian pathology to the practitioner.
3. The specialist in poultry practice.
4. Poultry problems of a general practitioner.
5. The importance of sound breeding, management and nutrition programs in maintaining resistance against poultry diseases.
6. Where do we go from here; a symposium on improving relationships with the leaders of the poultry industry to the benefit of the general practitioner.

Evening.—Veterinarians will attend the "All States" banquet, one of the outstanding events of the Congress.

The Congress includes too many high spots to be seen in one day, and it is suggested that veterinarians who do not plan to come for the entire 11-day session arrange a three-day stay—Tuesday, Wednesday, and Thursday—in order to include the pathology programs of the Congress on the day before and the day after A. V. M. A. Day, as well as to give an opportunity to view the many exhibits and points of interest.

Veterinarians desiring hotel accommoda-

Cleveland, July 28-Aug. 7, 1939

THE HALL OF LIVE POULTRY, THE WORLD'S POULTRY CONGRESS

In this hall will be displayed the most comprehensive collection of all breeds and varieties of poultry ever gathered under one roof. It is the purpose of Congress officials to gather and display here representative specimens of every known breed and variety of fowl; for this exposition, "poultry" has been defined to mean: "Everything that wears feathers." The visitor will see every breed of chicken, from the familiar breeds of our neighboring farm yards to rare and exotic varieties from the corners of the world; ducks, geese, turkeys, pigeons, water fowl, and other feather-bearing specimens, including the original jungle fowl from which our domestic fowl has been developed, the domestic fowl of Chile, which lays blue eggs, and Japanese birds with tail plumage more than 15 feet long

tions should write Mr. Ed Brennan, 1604 Terminal Tower, Cleveland, and indicate A. V. M. A. affiliation, asking for assignment to the Hotel Carter.

A $10.00 membership book now on sale in all states by Congress committees can be exchanged for a family membership enabling a veterinarian and his wife or other member of the family full admission to the Congress for the entire 11-day period, including the scientific sessions daily and other restricted functions which are being limited to foreign delegations and full Congress membership. In addition, this $10.00 membership includes a $5.00 official proceeding of the Congress, giving an English translation of all the scientific papers presented on pathology and disease control, genetics and nutrition; also one official Congress catalogue. The method of securing these memberships is as follows: write Dr. M. A. Jull, Secretary World's Poultry Congress Membership Committee, University of Maryland, College Park, Maryland. Ask for membership application form, fill out form and return application to Doctor Jull with the book of 10 membership certificates purchased from your local or state Congress committee; or send Doctor Jull with the application your check for $10.00. He will promptly send you the full membership card which is your admission to general and special events, and your copy of the official proceedings will be mailed you.

Veterinarians who wish to attend only the noon luncheon and the afternoon program August 2 need pay no Congress fees; single admission to the grounds may be had for 50c. This permits attendance at the popular lectures and admission to the live bird exposition, which will include 10,000 live birds on exhibit from all over the world—"everything that wears feathers."

Sulfanilamide in the treatment of Infectious Anemia

W. S. GOCHENOUR, C. D. STEIN, and O. L. OSTEEN,

Pathological Division, Bureau of Animal Industry
U. S. Department of Agriculture

SINCE experimental evidence indicates that members of the equine species, once infected with infectious anemia, continue to harbor the virus in the blood indefinitely, it is quite apparent that chronic cases and the so-called clinically-recovered, carrier cases remain a constant source of infection during the life of the animal.

One of the most needed adjuncts to control of this disease, therefore, is the discovery of a therapeutic agent capable of destroying the virus in infected animals.

In the search for a specific remedy for infectious anemia, investigators have tested the efficacy of a large number of well known chemotherapeutic agents, including arsenical and mercurial preparations, quinine, iodides, and various dyes, each of which was found to be of little or no value. The Bureau recently completed experiments in which formin, merthiolate, sodium cacodylate, hydrochloric acid, fuadin, crystal violet, and potassium permanganate were administered to infected horses in an effort to destroy the infection, but none of these chemicals had a specific action against the virus. A report of these experiments will be made later.

Since many favorable reports have appeared in the literature in recent months concerning sulfanilamide therapy in the treatment of both human and animal infections, it appeared desirable to test the value of this comparatively new drug in the treatment of equine infectious anemia.

An article entitled "Experimental Use of Sulfanilamide in Equine Therapy," by J. J. Arnold, appearing in the May, 1939, issue of VETERINARY MEDICINE, has just come to our attention. In this paper the author reports on the therapeutic value of the drug in a number of common diseases of horses and in conclusion states that sulfanilamide, on the whole, failed to give the sensational results reported by others, but did prove to be of some value in acute septicemia, less so in chronic conditions.

Preliminary Investigation

At the time the preliminary investigation was projected no definite information regarding the dosage of sulfanilamide for the horse, or its action on this animal, could be found in the literature.* Although the lack of this information proved to be a considerable handicap, preliminary tests on the therapeutic value of sulfanilamide on four horses affected with infectious anemia were carried out as follows:

The drug in 15-gram doses was administered twice daily to each of three horses by the intravenous method until a total of 450 grams had been given to each of two of the horses and a total of 480 grams to the third. To a fourth horse the drug was administered in powdered form in gelatin capsules, 15 grams twice daily until a total of 435 grams had been given. This treatment failed to arrest the course of the disease. None of the animals showed improvement in general condition and all continued to harbor the virus of infectious anemia, as proved by infectivity tests. No toxic reactions to the drug were observed in any of these animals.

The preliminary treatment experiments with sulfanilamide are recorded completely in Table I.

Because of the negative results obtained in the preliminary tests, it was deemed necessary to obtain definite information on the action of the drug in horses before undertaking any further tests to explore its usefulness in equine infectious anemia. It

* Subsequent to the completion of these experiments an article entitled "Sulfanilamide in Veterinary Therapeutics" by Gustave Labelle, containing information concerning the posology of sulfanilamide for large animals, appeared in *Vet. Med.* 33:11, p. 488.

TABLE I. PRELIMINARY EXPERIMENTS WITH SULFANILAMIDE IN THE TREATMENT OF INFECTIOUS ANEMIA IN HORSES

No. of Horse	Disease Type	Febrile React.*	Days Infected	Days Treated	No. of Trtmts.	Drug Form	How Admstrd.	Dose	Total Amt.	Febrile React.†	Result
953	Chronic	11	217	21	30	Solut.	Intraven.	15gm	450gm	0	No improvement§
1015	Chronic	11	76	21	30	Solut.	Intraven.	15gm	450gm	2	No improvement**
1044	Acute	3	7	21	32	Solut.	Intraven.	15gm	480gm	3	No improvement**
1036	Acute	2	11	19	29	Powder	Orally	15gm	435gm	5	No improv. Died††

*Before treatment. †After treatment. §The general condition was uninfluenced; the animal remained sluggish, the appetite poor, and an infectivity test following treatment was positive. **The recurrence of febrile reactions was not arrested. Infectivity test positive after treatment. ††Febrile reactions not arrested. The animal died of acute swamp fever during treatment.

Summary: The administration of sulfanilamide in these four horses failed to destroy the virus in the blood. No toxic effects of the drug were noted in any of these horses.

was believed that by administration of the drug to normal horses definite information might be obtained as to dosage, frequency, and best method of administration, rate of absorption and concentration in the blood, rate of elimination, and tolerance.

The problem of obtaining this information was discussed with Dr. E. K. Marshall, Jr., of the Department of Pharmacology and Experimental Therapeutics, School of Medicine, Johns Hopkins University. Doctor Marshall, who has had a wide experience in the field of sulfanilamide therapy, suggested the experiments on normal horses described in the following pages and agreed to make analyses of blood samples collected at stipulated intervals.

Tests to Determine the Action of Sulfanilamide on Normal Horses

In these experiments sulfanilamide was administered to six normal horses as follows: Two horses, Nos. 1-I and 2-I, received initial, intravenous injections of 25 grams of the drug dissolved in sterile water and six hours later a second intravenous injection of the same amount, making a total of 50 grams each. Horses, Nos. 3-F and 4-F, each received a single dose of 50 grams and Nos. 1070 and 1071 doses of 75 grams of the powdered drug administered orally in gelatin capsules.

Blood samples were collected from all animals at varying but stipulated intervals following administration of the drug. Urine samples were collected from the two horses that received 75 grams per os. Both blood and urine samples were forwarded to Doctor Marshall for chemical analysis.

A record of analyses of blood samples by Doctor Marshall and an evaluation of the results follow:

Blood Analyses

Horse 1-I: Weight, 1,065 lbs.—478kg.
10:25 a. m.—25gm sulfanilamide, or 0.052-gm per kg, intravenously
11:25 a. m.—Blood sample—7.4mgm. % sulfanilamide
4:25 p. m.—Blood sample—4.5mgm %
4:55 p. m.—25gm sufanilamide, or 0.052-gm per kg, intravenously
5:55 p. m.—Blood sample—7.9mgm %
10:25 a. m.—next day—Blood sample—3.2-mgm % sulfanilamide

Horse 2-I: Weight, 1,190 lbs.=540kg.
0 Hours—25gm sulfanilamide, or 0.046gm per kg, intravenously
1 Hour —Blood sample—5.0mgm % sulfanilamide
6 Hours—Blood sample—2.8mgm % sulf.
7 Hours—25gm sulfanilamide, or 0.46gm per kg, intravenously
8 Hours—Blood sample—6.7mgm % sulf.
25 Hours—Blood sample—1.7mgm % sulf.

Horse 3-F: Weight, 1,045 lbs.=472kg.
0 Hours—Blood sample—0.0mgm % sulfanilamide
0 Hours—50gm of sulfanilamide, or about 0.10gm per kg, per os
½ Hour —Blood sample—0.0mgm % sulf.
1 Hour —Blood sample—0.6mgm % sulf.
2 Hours—Blood sample—9.0mgm % sulf.
4 Hours—Blood sample—8.8mgm % sulf.
6 Hours—Blood sample—8.0mgm % sulf.
24 Hours—Blood sample—2.4mgm % sulf.

Horse 4-F: Weight, 1,035 lbs. = 470kg.
0 Hours—Blood sample—0.0mgm % sulfanilamide
0 Hours—50gm of sulfanilamide, or about 0.10gm per kg, per os
½ Hour —Blood sample—0.0mgm % sulfanilamide
1 Hour —Blood sample—1.2mgm % sulf.
2 Hours—Blood sample—1.8mgm % sulf.
4 Hours—Blood sample—7.0mgm % sulf.
6 Hours—Blood sample—7.2mgm % sulf.

24 Hours—Blood sample—1.7mgm % sulf.

Horse 1071: Weight, 1,075 lbs.=474kg.

0 Hours—Blood sample—0.0mgm % sulfanilamide

0 Hours—75gm of sulfanilamide, per os

3 Hours—Blood sample—10.0mgm % sulfanilamide

Table II. Experiments With Sulfanilamide on Normal Horses

Horse	Weight kg	Total Dose	How Admstrd.	Grams per kg	Milligrams of sulfanilamide per 100cc in blood after Admstrtn. ½ hr.	1 hr.	2 hr.	3 hr.	4 hr.	6 hr.	8 hr.	24 hr.
1-I	472	50gm*	Intraven.	0.10		7.4				4.5†	7.9	3.2
2-I	540	50gm*	Intraven.	0.09		5.0				2.8†	6.7	1.7
3-F	472	50gm	Capsules	0.10	0.0	0.6	9.0		8.8	8.0		1.7
4-F	470	50gm	Capsules	0.10	0.0	1.2	1.8		7.0	7.2		2.4
1071	474	75gm	Capsules	0.15				10.0			6.2	2.0
1070	460	75gm	Capsules	0.16				11.6			10.9	2.0

*Sulfanilamide administered in two doses of 25gm each. Given six hours apart.
†The second dose of 25gm of sulfanilamide was administered at this time.

8 Hours—Blood sample—6.2mgm % sulf.

24 Hours—Blood sample—2.0mgm % sulf.

Horse 1070: Weight, 980 lbs.=460kg.

0 Hours—Blood sample—0.0mgm % sulfanilamide

0 Hours—75gm of sulfanilamide, per os

3 Hours—Blood sample—11.6mgm % sulfanilamide

8 Hours—Blood sample—10.9mgm % sulf.

24 Hours—Blood sample—2.0mgm % sulf.

URINE SPECIMENS—8½ HOURS AFTER ADMINISTRATION

Horse 1071: 230mgm % free sulfanilamide; total 362mgm %.

Horse 1070: 200mgm % free sulfanilamide; total 415mgm %.

A summarized record of the milligrams % (milligrams of the drug per 100cc of blood) of sulfanilamide in the blood stream of normal horses at different periods following administration of the drug will be found in Table II.

Doctor Marshall reported that the results of the blood analyses indicate that in horses 1-I and 2-I, which received intravenous injections, the blood sulfanilamide levels are about what is found when the same dose in proportion to body weight is administered to other animals. The decrease in the blood level occurs at about the same rate as in man and dog. The analyses showed about one-half of the compound to be acetylated.

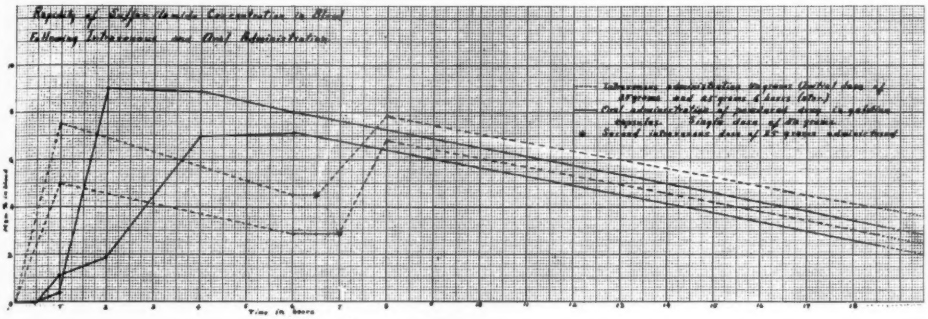
This experiment indicated that by the intravenous route in order to obtain a blood level similar to that used for therapeutic purposes in man, it is necessary to administer to horses about a total of 100 grams daily or twice the amount that was given to horses 1-I and 2-I. In horses 3-F and 4-F which received the sulfanilamide by mouth, there was a long latent period in absorption.

A comparison of the curves in Graph A covering the analyses of blood samples from horses treated intravenously and per os clearly illustrates the slower absorption rate when the drug is administered orally. Horses 1070 and 1071 were treated orally with 75 grams each of sulfanilamide to obtain information on the blood level at three and eight hours and to ascertain the concentration and state of sulfanilamide in urine samples procured 8½ hours later. The object of the urine examination was to definitely establish to what degree, if any, acetylation of sulfanilamide occurs in the horse. The results indicate that the horse conjugates sulfanilamide at almost the same rate as man.

When the drug is given per os, it was estimated from these experiments that to obtain a continuous minimum level of 10mgm per cent of sulfanilamide in the blood it would be necessary to administer 75 grams per os as the initial dose and 25 grams every eight hours thereafter; while to obtain a minimum level of 20mgm per cent would require a doubling of this dosage, or 150 grams as the initial dose, and 50 grams every eight hours thereafter. This procedure would closely approximate the practice observed for determining the therapeutic dose for humans.

The administration of sulfanilamide to normal horses in 50-gram or 75-gram doses produced no ill effects nor any noticeable toxic reaction.

Since sulfanilamide is only 0.8 parts in a hundred soluble it is necessary to add large quantities of sterile water to the drug for intravenous administration. When the drug is given in powdered form many gelatin capsules are required to administer large amounts. Both these means of administration are impractical for large doses such as 150 grams. Therefore, the use of the stomach tube was adopted for the administration of large quantities of the drug dissolved in water, and proved satisfactory.



GRAPH A.

Effect of Large Doses of Sulfanilamide

Three of the same horses, Nos. 953, 1044, and 1015, used six months prior to this time in the preliminary experiments and known to be infected with infectious anemia were selected for testing the therapeutic value of the drug in doses much larger than those employed in the preliminary experiment.

In accordance with the data obtained in the tests on normal animals it was planned to administer to such infected horses an initial dose of 150 grams and additional doses of 50 grams each every eight hours thereafter until a total of 550 grams had been given; the object being to maintain the concentration of sulfanilamide in the blood stream 20mgm per cent for a period of at least 72 hours. It was believed that this treatment schedule would serve to maintain a blood level in the horse equal to the maximum concentration employed for therapeutic purposes in man.

The powdered sulfanilamide was dissolved in tap water and administered per os by means of a stomach tube.

Horse No. 953, weighing 975 pounds, received an initial dose of 150 grams of the drug and 50 grams every eight hours thereafter. After receiving the third 50-gram dose, or a total of 300 grams, this animal manifested a severe toxic reaction and further administration was discontinued. The reaction in this animal was first manifested by restlessness, general weakness, staggering, and unsteady gait, later by trembling, sweating, inappetence, general distress, inability to remain standing, rapid pulse, and difficult breathing. The animal became moribund about eight hours following the last administration and died about 36 hours later. Examination of blood samples showed the maximum concentration of sulfanilamide to be 36.14mgm per cent at 32 hours. In fact, the blood level of sulfanilamide in this horse from the 3d to the 72d hour was at no time less than 27mgm per cent. This concentration was much greater than was intended and obviously, was fatally toxic.

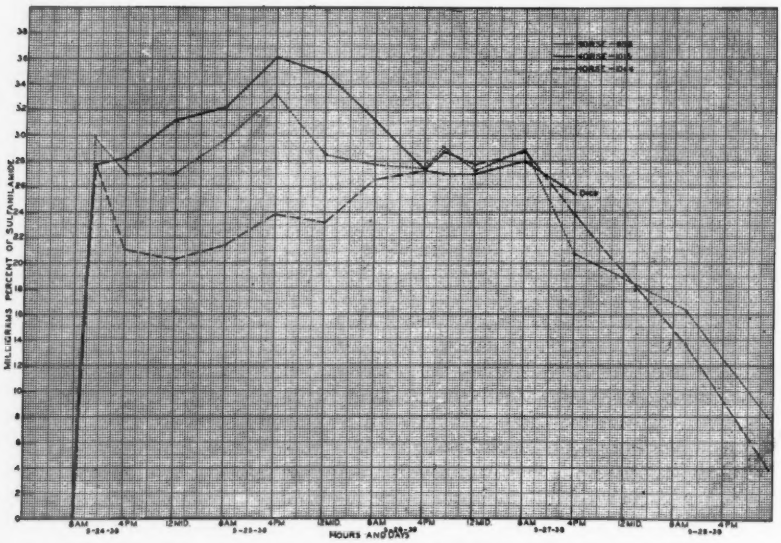
Horse No. 1044, weighing 1,000 pounds, received an initial dose of 150 grams and 50 grams every eight hours thereafter but after receiving the third 50-gram dose, or a total of 300 grams, showed indications of slight toxicity. The dosage was reduced to 35 grams and five doses of this amount were administered at 8-hour intervals until a total of 475 grams had been given within a period of 64 hours. The analyses of blood

samples showed a maximum concentration of 33.32mgm per cent at 32 hours. The blood level of sulfanilamide in this horse was, at no time from the 3d to the 72d hour, less than 27.00mgm per cent. It is evident that the dosage could have been still

during course of treatment of horses Nos. 953, 1015, and 1044 will be found in Table III.

Although a constant blood level well in excess of 20mgm per cent sulfanilamide was maintained for a period of more than

GRAPH B. CONCENTRATION OF SULFANILAMIDE IN THE BLOOD OF HORSES


MILLIGRAMS PERCENT OF SULFANILAMIDE
HOURS AND DAYS
8AM 4PM 12MID. 8AM 4PM 12MID. 8AM 4PM 12MID. 8AM 4PM 12MID. 8AM 4PM
5-24-38 5-25-38 5-26-38 5-27-38 5-28-38

further reduced in this animal and the 20mgm per cent blood level easily maintained.

Horse No. 1015, weighing 1,150 pounds, received an initial dose of 150 grams and 50 grams every 8 hours thereafter until a total of 550 grams had been administered within a period of 64 hours. This horse manifested no apparent ill effects. The analyses of blood samples showed a maximum concentration of 28.84mgm per cent at 72 hours but only 23.80mgm per cent at 32 hours. At no time during 72 hours was the blood level of sulfanilamide less than 20.30. Although this horse weighed considerably more than Nos. 953 or 1044, the rate of absorption appeared to be slower than in the other horses. This is well illustrated in Graph B, showing milligrams per cent of sulfanilamide in the blood at 8-hour intervals for a period of 95 hours.

A summarized record of the dosage and concentration of sulfanilamide in the blood

72 hours in the two surviving horses (Nos. 1015 and 1044) used in this experiment, the drug failed to destroy the virus of infectious anemia in horse No. 1044 which showed the typical intermittent febrile reactions characteristic of the disease a short time following treatment and eventually died of the disease. Horse No. 1015 was injured about 30 days following treatment and had to be destroyed before an infectivity test could be made on its blood.

It was apparent from these experiments that in order to maintain a constant blood level of 20mgm per cent of the drug in the horse an amount closely approaching the maximum tolerance dose must be administered.

It will be noted that during the first 24 hours of the treatment schedule each of the horses received the same amount of sulfanilamide, namely, 300 grams. However, horse No. 953, weighing 975 pounds (443kg), received 0.307gm per pound body weight

TABLE III. RESULTS OF EXAMINATION OF BLOOD SAMPLES FOR CONCENTRATION OF SULFANILAMIDE FOLLOWING ORAL ADMINISTRATION OF LARGE DOSES WITH STOMACH TUBE TO THREE HORSES; ALL AFFECTED WITH INFECTIOUS ANEMIA

			Horse No. 953			Horse No. 1015		Horse No. 1044		
Date 1938	Time	No. of hours	Dose in grams	Blood Mgm %	Remarks	Dose in grams	Blood Mgm %	Dose in grams	Blood Mgm %	Remarks
5-24	8 a.m.	0	150	0.		150	0.	150	0.	
	11 a.m.	3	—	27.77		—	27.77	—	30.0	
	4 p.m.	8	50	28.28		50	21.12	50	27.02	
	12 m.	16	50	31.24		50	20.32	50	27.02	
5-25	8 a.m.	24	50	32.24	Severe	50	21.42	50	29.70	Slight
	4 p.m.	32	—	36.14	reaction.	50	23.80	35	33.32	toxicity
	12 m.	40	0	34.88	Discont'd	50	23.24	35	28.56	Reduced
5-26	8 a.m.	48	0	31.24		50	26.54	35	27.76	
	4 p.m.	56	0	27.26		50	27.26	35	27.42	
	7 p.m.	59	0	27.02		—	28.82	—	29.14	
	12 m.	64	0	27.02		50	27.76	35	27.26	
5-27	8 a.m.	72	0	28.02			28.84		28.84	
	4 p.m.	80	0	25.40			23.80		20.82	
5-28	10 a.m.	90					13.76		16.30	
	3 p.m.	95			Died		Trace		Trace	
Total sulfanilamide administered				300gm			550gm		475gm	

(0.677gm/kg) and developed a fatal toxicity. Horse No. 1044, weighing 1,000 pounds (455kg), received 0.30gm per pound (0.659 gm/kg) and developed a slight toxicity. Horse No. 1015, weighing 1,150 pounds (523kg) received 0.25gm per pound (0.573 gm/kg) and showed no toxicity. Therefore, it appears that to avoid toxic symptoms in horses in which a blood level of 20mgm per cent of the drug is to be maintained, the total amount of sulfanilamide to be administered during the first 24-hour period should not exceed 0.26gm per pound body weight or 0.573gm/kg.

Effect of Sodium Sulfanilyl Sulfanilate

Sodium sulfanilyl sulfanilate is one of the many new compounds that have been synthesized from sulfanilamide. It is more soluble and more quickly absorbed and excreted than sulfanilamide. Although no information concerning the dosage or its action on horses was available it was thought advisable to administer this drug orally in the same amounts used in the sulfanilamide experiments to insure a continuous concentration of at least 20mgm per cent. The therapeutic level of sulfanilamide maintained in humans for the treatment of severe infections is from 10 to 20mgm per cent.

Horse No. 1017, a chronic case of infectious anemia, was selected for testing the viricidal properties of this drug. The drug was dissolved in tap water and administered per os by means of a stomach tube. An initial dose of 150 grams was administered followed by 50-gram doses every eight hours thereafter so that in a period of 64 hours a total amount of 550 grams was given. The administration of the drug produced no toxic or ill effects in the test horse, neither did it free the animal of the virus of infectious anemia.

Ten days following treatment, blood from this animal was collected and injected into a normal horse and after an incubation period of 22 days produced the typical symptoms of infectious anemia in the test horse.

This drug, therefore, like sulfanilamide, had no specific action on the virus of infectious anemia in the living animal.

Summary and Conclusions

A. In preliminary tests on the therapeutic value of sulfanilamide in equine infectious anemia, the drug failed to have any specific value against the virus or produce any toxic reaction in horses: (1) when 450 grams dissolved in sterile water were administered intravenously in two chronic cases in thirty 15-gram doses during a period of 21 days; (2) when 480 grams were administered intravenously to one acute case in thirty-two 15-gram doses in 21 days, and (3) when 435 grams were administered orally in one acute case in powdered form in gelatin capsules in twenty-nine 15-gram doses in 19 days.

B. As a result of the oral and intravenous administration of the drug into normal horses and analyses of blood and urine

samples collected at different intervals following treatment it was determined: (1) that no toxic reaction followed the intravenous administration of 50 grams of the drug dissolved in sterile water, when given in two 25-gram doses six hours apart; (2) that no toxic reaction followed administration of the powdered drug in gelatine capsules in single doses of 50 or 75 grams; (3) that absorption and concentration of the drug in the blood occurs at a more rapid rate when given by the intravenous method than per os; (4) that following intravenous injections the blood sulfanilamide levels are about what is found when the same dose in proportion to body weight is used in other animals and the decrease in the blood level occurs at about the same rate as in man and dog; (5) that when the intravenous method of administration is employed it would be necessary to give at least 100 grams daily to obtain a blood level similar to that used for therapeutic purposes in man; (6) that following administration per os there is a long latent period in absorption; (7) that the horse conjugates sulfanilamide at about the same rate as the human; (8) that when given per os to obtain a continuous minimum blood level of 10mg per cent of sulfanilamide it would be necessary to administer 75 grams as the initial dose and about 25 grams every eight hours thereafter, and (9) that to obtain a continuous minimum level of 20mg per cent would require 150 grams as the initial dose and 50 grams every eight hours thereafter.

C. As a result of the administration to three infected horses of sulfanilamide per os on a dosage basis to insure a continuous blood level of at least 20mgm per cent, i. e., 150 grams as an initial dose and 50 grams every eight hours thereafter, it was demonstrated: (1) that this dosage schedule in one horse was fatally toxic, in a second horse slightly toxic; (2) that maintenance of a blood level of sulfanilamide exceeding 20mgm per cent for a period of 72 hours failed to arrest the course of the disease or destroy the virus in one of the surviving horses treated, and (3) that to avoid the development of toxic symptoms in horses on a treatment schedule when a blood level of 20mgm per cent sulfanilamide is to be maintained, the total amount of the drug administered during the first 24-hour period should not exceed 0.26 grams per pound body weight, or 0.573gm per kg body weight.

D. With regard to the administration of the drug to horses it was demonstrated: (1) that small amounts of the drug ranging from 15- to 35-gram doses dissolved in sterile water may be administered intravenously without untoward results; (2) that larger amounts of the drug ranging from 50- to 75-gram doses in powdered form may be administered per os in gelatin capsules, and (3) that very large amounts of the drug, 100 to 150 grams, dissolved in water are more easily administered per os by means of the stomach tube.

E. The administration of 500 grams per os of sodium sulfanilyl sulfanilate within a period of 64 hours failed to destroy the virus of infectious anemia in a horse affected with the chronic form of the disease, neither did it produce any toxic reaction.

F. Although these studies constitute only a small part of a series of experiments conducted with a number of different drugs to determine their therapeutic value in equine infectious anemia, this report is published at this time because the information it contains may be of interest to those contemplating the use of sulfanilamide in the treatment of other equine infections.

Acknowledgment is made of the assistance of Dr. E. K. Marshall, Jr., Department of Pharmacology and Experimental Therapeutics, School of Medicine, The Johns Hopkins University.

We are indebted to Drs. W. T. Miller and F. M. Murdock, Animal Disease Station, National Agricultural Research Center, Beltsville, Md., for the assistance rendered in analysis of blood samples from treated animals. Also to Drs. J. A. Dollahite and L. O. Mott of the Pathological Division of this Bureau, who rendered appreciable assistance in administration of the drug.

Equine Encephalomyelitis Not Infectious in Saskatchewan

By C. HEAD, Regina, Saskatchewan, Canada

HAVING read a great many interesting accounts written by professors, research veterinarians, ministers of agriculture and others on the disease equine encephalomyelitis, rampant in the western prairies for the past few years, I feel that I as a practitioner would like to express my views on this disease.

This isn't a new disease. I had considerable contact with outbreaks many years ago when I was with the Health of Animals Branch of the Dominion government. It does not appear every year with the same intensity, nor does it affect every horse in the same way. I have had horses with paralysis of the face, tongue, pharynx, bowels, bladder, in fact nearly all of the internal organs. These different symptoms create many different opinions as to the disease. In one of the most interesting cases the larynx was paralyzed. By performing a hurried tracheotomy the gelding's life was saved. In my experience, by very simple treatment any horse can be saved except in extreme cases of paralysis of the bowels.

Having visited many pastures, farms, feed-lots and stables where the trouble exists, I do not believe it to be as it occurs in this province either contagious or infectious, or caused from the bites of flies, mosquitoes, insects, bugs, or flies getting into the horses' ears, but to be due solely to horses being allowed to consume moldy, musty feed or water, where the fungi or molds have had favorable conditions for growth.

Water is a chief source of the trouble; water from sloughs, dugouts, supply tanks, uncleaned water-troughs, or any place that the water has been allowed to become stagnant; cisterns near or under stables, and creeks that have stopped running during a dry season and leave sloughs or muskegs where water accumulates to which stock have access. Stock prefer water from sloughs or dugouts to spring water or flowing wells, possibly because it is warmer.

On a farm near here where there is a flowing well in the pasture, six horses took the disease and three succumbed. I investigated to satisfy my own curiosity and discovered the horses were drinking from a dirty slough near the flowing well. In every single case that I ever found to be due to contaminated water (and there have been a great many), when the water was changed there was no more trouble.

Fodder is another common source of this ailment, and I have encountered many outbreaks with serious loss before the cause of the trouble was removed. Oat sheaves or hay from stacks that have become moldy or musty, due to many causes, such as being harvested damp and then put into stacks or lofts, being cut from old slough bottoms that have dried up, or being packed in lofts and heated, are frequent causes of the loss of horses from this ailment.

Serious outbreaks occur chiefly at seasons of the year when the water is getting low or the supply of fodder in hay stacks and granaries is nearing exhaustion. The weather being hot makes more favorable the conditions for the growth of the fungi or molds which are the cause of the trouble.

Sometimes after the feed and water are changed the trouble still continues. This is very puzzling, but sooner or later it can be solved by perseverance. Some time ago a farmer lost 14 horses from cerebrospinal meningitis, encephalomyelitis, botulism, sleeping sickness, or whatever "pet" name the diagnostician prefers. Veterinarians, laymen, quacks, all realized what it was, and advised changing the food and water, and their treatment included almost everything found in the pharmacopeia, all with

negative results. When the fodder was examined it was found to be sweet and clean; it had been taken from a farm where there were 30 horses all eating the same, and they did not have any sickness. The water was being drawn from a deep well; several other farmers were using the same water for their horses, without having any cases of the sickness. Consequently, the owner and his neighbors and "sightseers" (of which there are generally many) "booed" the idea that there was the possibility of the horses having contracted the disease from either the feed or the water, in this instance. On making inquiries I discovered that they were drawing the water from the clean well; but they were storing it in a cistern under the stable and pumping it from there into the troughs. I advised the farmer to stop using the cistern, which he did, and there has been no encephalomyelitis since.

Doctor Head in this article discusses the type of encephalomyelitis that occurs in his locality. The demonstration of the virus, not to say the results of vaccination in thousands of cases, answer the question of whether the infectious type of the disease occurs elsewhere. It should be borne in mind, however, that the toxic (noninfectious) type of the disease, clinically indistinguishable from the infectious type, occurs pretty much everywhere; that is, alongside the infectious as well as in territory not yet invaded by the latter type. While the prevalence of toxic encephalomyelitis is greatest in the early winter, it occurs at all seasons, as Doctor Head points out. When, during an epizoötic of the infectious type of the disease, occasional cases occur in vaccinated animals, the conclusion that it represents a failure of the vaccine may not be justified. It may be a case of the toxic type of the disease.

It's the differing aspects of every case that complicate matters, and to be on to all the conditions a veterinarian needs to be a detective. Clean water put into dirty, filthy tanks, cisterns or watering troughs; water drawn from dirty, moldy dugouts or supply tanks and put into clean barrels or watering troughs; clean grain stored in a granary where there is old, musty chop on the floor. On one farm five valuable horses died from this latter cause. They had been given three feedings, morning, noon and night, and turned into the pasture for the night. In the morning one was dead and two were dying. Naturally there was considerable excitement on the farm; this represented the breaking up of two six-horse outfits. The result was that nothing was done on the place for a week and the horses were left in the pasture, the owner expecting that some of the other horses would be stricken down. However, there was no more trouble; the outfits were replaced and work was again commenced. The outfits worked one day, receiving three feedings, morning, noon and night, and were turned into the pasture for the night. The next morning at 5 a. m. two horses were wandering around walking into anything, wabbling, going in circles; finally they went down and their actions were pawing and racy. These horses never tried to roll over on their backs (there never has been a case of encephalomyelitis where the horse tried to roll over). No more of the chop was fed and there was no more trouble. I have seen turkeys, chickens, and hogs die with symptoms similar to encephalomyelitis, from eating moldy grain, and wild ducks died in great numbers from feeding around sloughs that had become low so that the feed around them had become moldy.

From my experience I do not believe equine encephalomyelitis to be either contagious or infectious. I have seen affected and well horses eat from the same box, drink from the same pail, yet never have

seen a case contracted from another nor from anything but contaminated (moldy) feed or water. Due to a very small stable a horse suffering from the disease had to be placed in the same stall as his mate, and in this way they were eating out of the same feed-box and drinking out of the same pail. I gave a hypo of one grain of arecoline to the sick horse to increase the flow of saliva. This horse slobbered on the chop and even with the well horse eating this chop he did not contract the disease. I have taken swabs of partly-chewed hay or oat sheaves from the mouths of horses suffering from encephalomyelitis, which were unable to swallow, and fed it to healthy horses with negative results. I have injected blood which I took from horses dying from this same disease into perfectly normal horses and there was absolutely no reaction or symptoms of encephalomyelitis.

Here I would like to mention my views on vaccination and serums. Horses have been vaccinated with all makes of vaccines and it did not prevent them from taking the disease, and in many cases dying. Vaccinating horses without first removing the cause is almost sure to fail. Vaccinate horses on farms where there never was any trouble and not likely to be, and the vaccine will be highly recommended; but vaccinate horses on places where they do contract the disease and "you never give it soon enough," or "it wasn't the right kind," or "it was out of date," or "the veterinarian couldn't have administered it properly"—there is always an alibi.

In Regina, we have a great number of horses used for delivery purposes, and saddle and race horses as well. There has never been one case amongst these horses that was contracted in the city. There must be a reason. There is. Here I might mention the case of a cartage horse that did contract the disease and almost made it necessary for me to change my views entirely; however, not being satisfied, I tried to find out all I could of the conditions leading up to the case. I discovered that the drayman had taken four horses to the country to do work. He took along their feed from town, but knew they would have water. At noon he fed them and watered them from a well that had not been used for some time. The Belgian gelding took a long drink; the other horses drank very little. The owner said the water did not seem to suit their taste. The second night I was called to see the gelding. A real case; pulling back in the halter, leaning against the stall, sometimes very excited, other times sleepy, eyes congested, rigid contraction of the neck-muscles, twitching at flanks and shoulders, neighing, squealing, jaws partly closed as in lock-jaw, pulse, temperature and respiration normal, which has been my experience in all cases in the first stage of the trouble.

In conclusion I must say that in Saskatchewan, many horses were vaccinated with all kinds of vaccines and by different veterinarians, in districts where the disease was prevalent last year. Several took the disease and died. No later than January, 1939, when the thermometer was 20° below zero, and six inches of snow covered the ground, a farmer lost 11 horses from this very same disease, encephalomyelitis. When the cause of the trouble was removed that ended the sickness.

I have five stallions which were traveled during the breeding season 1938, in Manitoba and Saskatchewan. They all stopped at places where colts and horses had the disease and several had died. My grand champion percheron stallion traveled three months in Manitoba, and every place he stopped many horses were sick and many had died. Several of these horses had been vaccinated, but my stallion had never been vaccinated. The groom had been advised to be careful in what feed and water he gave him, with the result that the animal returned home in perfect health.

If the owners of horses, the manufacturers of vaccines and serums, and the governments insist on vaccination, no doubt it will be carried out, but at a very large expense, and if this year happens to be one in which there is no outbreak of the disease, then everybody will be satisfied.

Artificial Insemination of Cattle*

By D. KUST, Giessen, Germany
Director of the Ambulatory and Obstetrical Veterinary Clinic, University of Giessen

ARTIFICIAL insemination means the introduction of semen obtained from the male into the sexual apparatus of the female, for the purpose of fertilization without sexual intercourse. The history of artificial insemination of domestic animals reaches back into the 14th century, but the practice did not come into general vogue until about 40 years ago—until after the publication of the successful experiments of E. Ivanoff, who first inseminated cattle artificially.

Economic Significance

Until a few years ago, artificial insemination of domestic animals was practiced, on a significant scale, only in Russia. However, extensive experiments and practical trials have been carried out in all civilized countries of late years, as evidenced by the voluminous literature. Artificial insemination has become of marked importance in cattle breeding for various reasons. The perfection of the methods of collecting semen makes it possible to get sperm in excellent condition and in sufficient amounts from the bull. This in turn has opened up new avenues of research into the physiology and pathology of reproduction, and into the study of the interrelationship between sperm production and the feeding and management of breeding animals. Examination of the collected seminal fluid provides a better method for evaluating for breeding purposes bulls that were formerly considered impotent. Further, artificial insemination provides for the more extensive use of bulls of unusual value, since from one ejaculation the fecundation of a number of females may be accomplished. This is particularly advantageous for coöperative breeder's associations and owners of large herds, possessing only one or a limited number of bulls of proved high breeding value. Certain forms of sterility in the female caused by displacement of the uterine orifice, cicatrization, and other malformations of the external sexual organs, may be counteracted only by artificial insemination. This method is of special value in the fight against coital infection, because the latter can be controlled effectively only when a complete breeding quarantine is put into effect among infected animals. The economic damage from the loss of calves and milk, caused by the quarantine, can be alleviated by artificial insemination, and by no other method.

Collection of the Semen

The success of artificial insemination depends primarily upon the collection of a perfect specimen of semen in sufficient quantity. Each method of collection depends upon adhering to certain basic principles. (1) It must be possible at all times to collect the semen in sufficient quantity, absolutely pure, and without foreign elements or impurities. (2) Under no circumstances must the vitality and inherent power of fecundation of the spermatozoa be impaired. (3) The concentration of the semen, that is, the number of spermatozoa per cc, must correspond to natural conditions. (4) The manner of collection must in no way interfere with the health of the donor; and (5) the whole method must be simple, and at all stages readily applicable, to avoid delay.

There is general agreement that the collection of semen by means of an artificial, rubber vagina conforms most closely to these postulates, and that this method is far superior to any other, and consequently, is the method of choice. During recent years, the rubber vagina has been modified and improved in various ways. We use the "Hannover" model. It consists of a rigid outer wall, 60cm long and 7cm in diameter,

*Presented at the XIII International Veterinary Congress, Zürich-Interlaken, Switzerland, Aug. 21-27, 1938. Translated by F. Volkmar, Chicago, Ill.

and an inner tube of the finest quality of soft rubber tubing. The outer wall and the inner tube are connected at each end by a sponge-rubber ring, 2cm wide and 1cm thick; thus the opening is made narrow, though elastic, in order to produce friction when the penis enters it. The space between the inner and outer tube is filled with water at a temperature of 45°C. (113°F.) just before use, in order to bring the temperature of the entire apparatus up to natural body temperature. As soon as the proper temperature has been reached, the water is drained out, except for a small quantity. One of the openings of the tube is fitted with a graduated glass, seminal receptacle which tapers toward the closed end. It is fastened by means of a special support. The other end of the artificial vagina which serves for the entrance of the penis, is well lubricated with vaseline and the vagina is ready for use. Special care is taken that the temperature is not allowed to fall below body temperature, because many bulls ejaculate poorly or not at all when the vagina is cool.

There are two methods by which the artificial vagina may be used. By the first method, the bull is allowed to mount a cow, and the erected penis is directed by hand into the apparatus prepared for the reception of the semen; the second method consists of fixing the vagina securely in a specially constructed phantom. When using the former method, the attendant stands on the right side of the animal and at the moment of mounting the prepuce of the bull is grasped; pushing the penis somewhat to the side, its tip is directed, as quickly as possible, into the artificial vagina, which is held in the right hand. Immediately after the rapidly following second push, resulting in ejaculation, the apparatus is withdrawn in the line of direction of the penis, keeping the end containing the glass receptacle for the semen well down to drain off the ejaculate. If the vagina has been well prepared, and is skillfully manipulated, the ejaculation will take place normally and at the first mounting. Occasionally, several mountings may become necessary in order to collect sufficient semen of perfect quality.

Using the phantom method, the vagina is prepared as outlined above, and fastened by special means to the phantom, which most bulls mount just as readily as they mount a cow in heat. Sometimes several mounts are necessary in order to get a sufficient quantity and proper quality. Occasionally a bull will refuse the phantom. This happens especially with young bulls which have never served before, or with animals whose attention is distracted by other cows or by noises. The phantom should be placed upon soft ground in order to eliminate noises, which are unavoidable when the apparatus becomes disarranged. Cows in heat, loitering strangers, in short, anything that might distract the bull, must be banished from his range of vision and of hearing.

The artificial vagina forms the most reliable and suitable means for collecting semen from bulls in sufficient quantity and perfect quality for systematic artificial insemination and for scientic investigation. The procedure takes relatively little time, and with some experience can be accomplished by one person.

Characteristics of the Semen

The amount of sperm collected from an individual bull varies from 0.5 to 14cc. The usual amount ranges between two to 6cc; the average of several hundred collections being about 4.5cc. Young bulls, frequently, ejaculate a less quantity of sperm than older ones. Generally, sperm of good quality is a dense, opaque, creamy, slightly ropy fluid; its white color and flaky consistency is attributable to the spermatozoa and the degree of these characteristics indicates the concentration of the sperms. Admixture of urine, blood, and other substances alters the naturally clear, white color and creamy consistency; at the same time, the number of spermatozoa per cubic unit becomes less, so that the value of the ejaculate is lowered. The number of spermatozoa per cubic unit is subject to great variations. The number of spermatozoa per cubic

millimeter, calculated from several hundred ejaculates of healthy bulls, ranges from 350,000 to 2,370,000. When the semen is collected at short intervals, the concentration of the spermatozoa may rise considerably, thus making the second and third ejaculate qualitatively more valuable.

For the evaluation of a good sperm, suitable for fertilization, one must know the pH value. The pH value of the normal sperm of healthy bulls is just below the neutral point, that is, in the acid part of the scale. Whenever possible, only semen with a pH value between 6.3 and 7.0 should be used for artificial fertilization. Any alkalescence is proof of contamination, especially with urine; this contamination lowers the concentration of the spermatozoa, and the vitality of the individual sperm cells. There exists a certain relationship between pH value on the one hand, and the number of spermatozoa and their vitality on the other. In fresh semen, collected under model conditions, 85 to 95% of the spermatozoa display an animated motility, occasioned by a whirling motion, intended to facilitate contact with the egg, and a spiral motion, intended to facilitate penetration into the egg. In uncontaminated, fresh sperm one can always note a certain strong forward movement of the spermatozoa. Though no definite conclusion can be drawn from the intensity of the motion of the spermatozoa with respect to their power of fertilization, still intensity of motility must be regarded as one criterion for prompt fertilization. Even in healthy sperm there is always present a number of atypical and pathological spermatozoa, differing in size and form from normal especially in the joint and the tail. The curvatures observed in tails are to be considered as the expression of a reaction, and are often seen in the last stages of life. Whenever the pathological forms exceed a certain percentage, the semen is considered to be unfit for use. The macroscopical and microscopical examination of a sample of sperm gives a broad picture of its quality and suitability for artificial insemination. Under certain conditions the macroscopical may be more important than the microscopical examination.

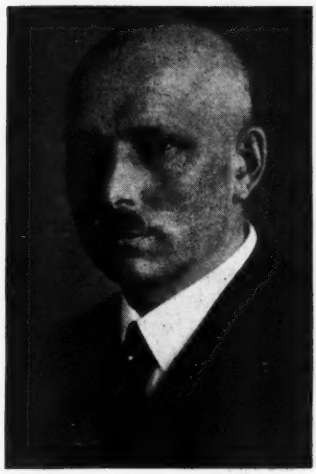
The Handling and Storage of Semen

The goal of every collection of semen is to obtain the sperm in such a manner that the spermatozoa can be kept viable and capable of fecundation for as long a period as possible. The main desideratum, therefore, is to avoid everything that can harm it during the process of collection, storage, handling, and injection. Direct sunlight, all organic and inorganic acids, bases, and salts, likewise disinfectants and glycerin, even ordinary water, tap water, and distilled water are very destructive to the vitality of the spermatozoa. Bacterial contaminations, admixtures of pus, blood, and urine, possess a similar harmful action. The vitality of the spermatozoa is also adversely affected by temperatures of 40°C. (104°F.), and higher; by temperatures below freezing, and by continued contact with metals. All instruments and apparatus needed for the collection of semen and for the artificial insemination should be made of hard rubber or glass. Immediately after use the utensils should be cleaned in soda solution, and rinsed with 65% alcohol. Just before they are used again, they should be rinsed well in a physiological solution. We use for this purpose physiological saline solution, because it is very simple to obtain, keeps for a long time, and is inexpensive.

Fresh semen which is not used immediately for artificial insemination, is stored most suitably in a refrigerator at temperatures ranging between 3° and 7°C. (37.4° and 44.6°F.), in well stoppered glass tubes with complete exclusion of light and air, but without dilution or treatment. When these precautions have been observed, then properly collected sperma can be kept viable for as long as 368 hours. But whether it is still capable of fertilization has yet to be learned by fertilization trials. Of cows which were inseminated with semen, 48 hours old, 60% became pregnant. Some of the cows inseminated with

semen stored for 72, or even for 120 hours, likewise became pregnant. This indicates that sperma stored at low temperatures for 120 hours does not lose its power of fertilization. How much longer this power can be retained has not been ascertained as yet. None of the media for dilution or conservation that has been tested so far prolongs the life span of the spermatozoa, or increases their motility. The low temperatures slow down all biological activity considerably. Bacteria which readily enter the seminal fluid during the process of collection are unable to develop; even the metabolic processes of the spermatozoa themselves are reduced. At high temperatures, especially in an incubator, the spermatozoa exhibit at first a certain excitability and quickened motility, but the motility soon subsides and, shortly, ceases entirely. This behavior is due to the excretion of products of catabolism by the spermatozoa, and to decomposition caused by the growth of bacteria.

Experience teaches that diluted sperm gives far better results in insemination than naturally dense sperm; this applies especially to the very concentrated sperm of ruminants. The dilution necessary for the purpose of fecundation should be made just prior to use. Various physiological solutions have been recommended for the dilution of the collected semen. We have tested physiological saline solution, Ringer's solution, tyrode solution, and solutions No. 1 and No. 2 of the Russian authors. According to our experience, the glucose phosphate solution (solution No. 2), and the physiological saline solution are the most convenient diluents for all practical purposes. Mixing with solutions No. 1 and No. 2 does not prolong the life of the spermatozoa, although the intensity of motility is temporarily increased, that is, the movements appear faster and more powerful. On the basis of our observations, the physiological saline solution must be regarded as equal in all respects to the other media tested, as far as general utility is concerned. It possesses the advantage of being always at one's disposal; it keeps indefinitely, and is inexpensive. For the purpose of artificial insemination of cows we use freshly drawn or stored semen, diluted with physiological saline solution immediately before injection to five times its original bulk.



DIETRICH KUST

Doctor Kust, professor of veterinary obstetrics, was born at Badbergen, province Hannover, Germany, on March 2, 1888. He studied veterinary medicine at the veterinary colleges at Hannover, Dresden, and Berlin. From the latter institution he received his veterinary diploma in 1910. In 1911 he received the degree of "Dr. med. vet." from the same institution. After completing military service and participating in the world war he was appointed first assistant at the ambulatory clinic of the veterinary college at Hannover during four years. Subsequently he was appointed veterinary sanitary officer for the district Springe, Hannover, for a term of four years. In October, 1928, Doctor Kust accepted a call to the University of Giessen, Hessen, as Director of the ambulatory and obstetrical veterinary clinics. His principal researches cover investigations into the hormonal diagnosis of pregnancy, the control of sterility in animals, and the artificial insemination of cattle.

Technique of Insemination

The practical application of artificial insemination of a large number of cows no longer presents difficulties. We are always able to secure or collect perfect semen in sufficient quantities from breeding bulls. The proper methods of handling have been established by investigations, and we are now able to store the semen for a certain length

of time without loss of potency. The sperm to be used is examined macroscopically with regard to quantity, color, consistency, and foreign matter; and microscopically with regard to density of the sperm, the motility and the character of the individual spermatozoa. After the seminal fluid has been diluted with body-warm physiological saline solution (this must be done slowly), the density, motility, and characteristics of the individual spermatozoa are again tested microscopically. When this examination is made in sunlight, it is expedient to use brown glass in the apparatus.

The simplest, quickest, and consequently most suitable method of insemination is by means of a tubular speculum and a source of light which allows a view of the vagina and the external orifice. Disease conditions may be recognized at the same time. This method corresponds most nearly to natural conditions and is easily applicable to heifers. We use an apparatus equipped with a light bulb; it allows the syringe, filled with the semen, to be pushed very close to the external orifice, and yet it can be manipulated and regulated closely from the outside. The syringe, filled with the semen and equipped with a light bulb, is pushed forward through the speculum, the light is flashed on, and the vaginal tube and the cervix are examined for disease conditions. If the surfaces appear healthy, then 1cc of the diluted seminal fluid is injected into the orifice. If several animals are to be inseminated in succession, the hard rubber tip of the syringe used is disconnected and replaced with a new one, in order to avoid possible transmission of disease germs.

Insemination in Practice

Many have doubted that artificial insemination of cows could ever become of practical importance economically. The introduction of a new method, and that applies especially to artificial insemination, always meets with certain obstacles, and is dependent upon various circumstances. The ultimate requirement is that the method be simple, easily accomplished, and reliable. Neither during the collection of the semen, nor during the insemination, should it involve danger or inconvenience to the bull, to the cow, or to the developing fetus. All apprehensions on those scores have been banished by the experiences of the past few years. In the fight against the ever-spreading coital infection lies the greatest economic importance of artificial insemination. Coital infection can be successfully combated only when natural breeding is suspended entirely for some time. But this measure is harsh and inconvenient to the breeder, because a considerable economic damage results from the loss of offspring and milk. In order to offset these losses, artificial insemination may be practiced during breeding quarantine. This is the only sure method for the prevention of coital infection, or for checking its spread; this applies especially to trichomoniasis.

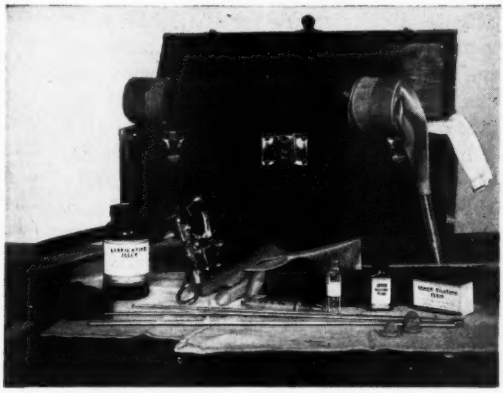
The prophylactic measures are initiated by the artificial insemination of all clinically healthy heifers, and all cows which have calved at least three months previously and have not been served again. Animals which are or have been infected are not inseminated until three months following recovery. The semen is collected in the artificial vagina, examined, diluted, and injected. When artificial insemination is to be practiced in several villages, a single collection of semen will suffice, because the transportation in the glass container and in a diluted state does not interfere with the power of fecundation if the necessary precautionary measures are observed. Even semen that has been stored 24 hours or more, at temperatures of 3° to 7°C., may be used if upon examination there are sufficient living and motile spermatozoa present. Only semen from absolutely healthy bulls must be used, since animals suffering from chronic trichomoniasis often discharge these protozoa in their ejaculate. In a large number of cases we have transmitted this disease by artificial insemination. Several animals contracted endometritis or pyometra, and a few aborted from trichomoniasis alone.

Of 813 artificially inseminated cows and heifers from five villages in which tricho-

moniasis was enzoötic, 580, or 71.34%, became pregnant following the first insemination. The percentage of successful pregnancies in the individual villages varied between 50% and 81%. Whenever insemination had to be repeated, the animals either were infected, or had not recoverd completely from a previous infection, or the semen was injected after the period of estrus was over. It was found most expedient to inject the semen at the height of estrus, because then a mature egg is present, and fecundation is, therefore, most probable. All animals which are sexually diseased, or which have not recovered completely from a venereal infection, are to be excluded from insemination, because in such cases fecundation cannot be expected.

At my request, several practicing veterinarians experimented with artificial insemination as a means of combating trichomoniasis. They applied themselves to the task with great interest, conscientiousness, and success, to the great satisfaction of the owners. According to the reports of the individual veterinarians, the percentage of fecundation in more than 800 inseminated animals varied between 60% and 75%. All these reports agree essentially on the fact that artificial insemination of cattle is easily accomplished in practice, and is of great value in the fight against coital infection. Provided healthy bulls are used, and sanitary precautions observed in the collection, storage, and injection of semen, it is an absolute safeguard against the introduction of infection, and it protects the breeder from severe economic damage during quarantine periods. It also makes for considerable shortening of the quarantine period.

Artificial insemination has also been practiced successfully in numerous cases in which sterility is due to such causes as malformation or displacement of the cervix, the vagina, or the external genitals; likewise, in cases of nymphomania for which there is no clinically recognizable cause. Another important economic value lies in the fact that high-priced male breeding animals can be made more useful, because valuable hereditary characteristics can thus be preserved. The simple and convenient manner of collecting a proper specimen of semen at any time from a bull by means of the artificial vagina, enables one to check the breeding potentialities of any bull. Very often cases of sterility in bulls can thus be cleared up.



ARTIFICIAL INSEMINATION EQUIPMENT

Including: artificial vagina, vaginal speculum, glass insemination tube, all-glass syringe, chemical thermometer, glass rod, semen vials, finger cots, semen diluting fluid, thermos bottle, lubricating jelly, obstetrical sleeve, rubber gloves, and carrying case.—*Courtesy Jensen-Salsbery Laboratories.*

Breeders have often seriously questioned whether the offspring of artificially inseminated animals are on a par with the parent stock. Both from biological considerations and from actual experience, such an argument is untenable. Calves born through artificial insemination do not exhibit any uncommon characteristics; above all, do not show any weakness in regard to development and health. Gestation and weight at birth vary between normal physiological limits. No sex-determining influence can be established. The development of the calves is always normal, and compares favorably with that of the offspring from naturally mated cows.

Efficacy of Commercial Phenothiazine in

Introduction

THE nodular worm, *Oesophagostomum columbianum*, ranks with the stomach worm, *Hæmonchus contortus*, as one of the most pathogenic parasites of sheep. Treatment with copper sulphate and nicotine sulphate is satisfactory for the removal of stomach worms, but no treatment satisfactory for the removal of nodular worms has been previously discovered. Treatment by enema, first employed by Brumpt (in Brumpt and Cauchemez, 1911)[1] in France, and subsequently modified by Veglia (1928)[7] in South Africa, and Clunies Ross and Gordon (1936)[2] in Australia, is a tedious procedure and may cause rupture of the colon. The mixture of chemicals proposed by Mönnig (1935)[5] in South Africa for the removal of nodular worms must be given in divided doses and on two successive days, this necessitating handling the animals twice. As shown by the data recorded in this paper, phenothiazine, a chemical which has already attracted wide attention as an insecticide (Smith, 1937)[6] and which has been suggested for the removal of nodular worms from swine (Harwood, Jerstad, and Swanson, 1938)[4], possesses characteristics which may make it valuable as a treatment for the removal of nodular worms and other helminths from sheep.

Materials and Methods

The phenothiazine product used in these experiments was obtained from commercial sources and was known to be somewhat impure, containing about 95% phenothiazine. In this state, phenothiazine is a light, bluish-grey powder, insoluble in water, nearly tasteless, but causing a slight stinging sensation when placed on the buccal mucosa.

The sheep used were cull ewes and rams. Before treatment, the feces of each animal under test were examined for nematode eggs, and the species present in the animal determined in so far as possible.† The sheep were fasted for 24 hours and then given a small feeding that consisted of equal parts of oats, bran, alfalfa meal, and molasses; to this mixture was added 20% by weight of phenothiazine. This mixture was consumed by some animals after a few hours, but it was not completely consumed by others until one or more days had elapsed. After treatment the sheep were confined to a small pen having a concrete floor, and fed a ration which consisted mostly of oats and bran. The feces were collected daily, and examined for worms by the usual technique. As soon as the elimination of worms ceased, usually about seven or eight days after treatment, the animal under test was killed and the gastrointestinal tract examined carefully for all helminths present. This technique yields results that are reasonably accurate for species of Oesophagostomum, Bunostomum, and Chabertia that parasitize sheep, but the effect of phenothiazine on the various members of the Trichostrongylidæ could not be determined accurately.

Experimental Results

Phenothiazine given to two sheep at a dose rate of 0.25gm per pound of body weight, and to eight sheep at a dose rate of 0.5gm per pound, gave results that are summarized in table I. The two sheep (Nos. 9 and 10) which received the small dose (0.25gm per pound) were infested with 87 hookworms, of which only 10 were removed by the drug. The efficacy of this small dose of the drug for the removal of nodular worms was also low, since only 33 of a total of 51 nodular worms (65%) were removed by the treatment from these two sheep. The eight sheep (Nos. 1-8) receiving 0.5gm of phenothiazine per pound of body weight eliminated 244 hookworms and 844 nodular worms. At necropsy a total of 74 hookworms and 84 nodular worms were found in the intestine. Therefore, the efficacy of phenothiazine in these experiments was at least 76.7% for the removal of hookworms and 90.9% for the removal of nodu-

†The specific determinations of the nematode eggs were made by Dr. Doys A. Shorb of the Zoölogical Division.

the Removal of Roundworms from Sheep

By Paul D. Harwood, Robert T. Habermann, and A. C. Jerstad*,

Zoölogical Division, Bureau of Animal Industry, U. S. Department of Agriculture

Washington, D. C.

lar worms. Thirty-eight worms recovered from the feces of these animals were so badly macerated that it was impossible to identify them, and they were not considered in computing the percentages; it is obvious, therefore, that the actual percentages of efficacy were slightly higher than are indicated by the figures given.

TABLE I. EFFICACY OF COMMERCIAL PHENOTHIAZINE FOR THE REMOVAL OF HOOKWORMS AND NODULAR WORMS FROM SHEEP

Designation and sex	Weight in pounds	Dose in grams	Date of treatment 1938	Worms removed			Date of necropsy 1938	Worms found P.M.		Efficacy of treatment	
				Hookworms	Nodular worms	Unidentifiable		Hookworms	Nodular worms	Hookworms percent	Nodular worms percent
1 female	72	36	10/25	83	28	1	10/31	0	3	100	90.3
2 do	75	37.5	10/20	2	6	0	10/26	3	0	40	100
3 do	95	47.5	11/8	125	296	16	11/15	9	2	93.3	99.3
4 do	71	35.5	11/15	5	56	2	11/25	0	0	100	100
5 male	67	33.5	11/29	2	3	1	12/6	23	0	8	100
6 female	76	38	12/5	7	265	6	12/20	38	61	15.5	81.3
7 do	68.5	34.1	12/6	17	126	10	12/15	1	13	94.4	90.6
8 do	59	29.5	12/7	3	64	2	12/21	0	5	100	92.5
9 male	49	13	11/28	10	1	3	12/5	35	0	22.2	100
10 female	75	18.7	1/5 (1939)	0	32	0	1/12 (1939)	42	18	0	64

Sheep Nos. 9 and 10, which received 0.25gm of phenothiazine per pound of body weight, were infested with Hæmonchus and Ostertagia as determined by fecal examination. At necropsy 56 Hæmonchus and several Ostertagia were found in sheep No. 10, but sheep No. 9 was negative for both species. Hæmonchus and Ostertagia eggs were present in the feces of each of five of the eight sheep which were dosed with phenothiazine at the rate of 0.5gm per pound of body weight. As no Ostertagia was found in any of these animals at necropsy, all of these worms were apparently removed by the treatment. In the abomasum of sheep No. 6, a thousand or more Hæmonchus were found, but the other four animals known to have been infested with this stomach worm before treatment were negative for Hæmonchus at necropsy. It should be noted that sheep No. 6 was very hesitant about consuming the feed containing phenothiazine, and not all of it was eaten, until more alfalfa was added to the mixture and the animal's appetite tempted by repeatedly sprinkling the surface of the medicated mixture with oats. A total of five days elapsed before all of the drug was consumed. It is interesting to note that the drug removed relatively fewer nodular worms from this animal than from any other animal receiving 0.5gm of phenothiazine per pound of body weight. These data suggest that phenothiazine was 100% effective for the removal of Ostertagia and about 80% effective for the removal of Hæmonchus.

It was determined that commercial phenothiazine removed some of the Cooperia and Trichostrongylus present in these experimental animals before treatment, but it is not possible to estimate the relative numbers of these nematodes that were removed by the treatment.

Macroscopic lesions observed following treatment with phenothiazine that could be associated with the action of the drug were slight or absent from these animals. Sheep No. 3 exhibited an area about three inches in diameter of superficial necrosis in the rumen, and two similar lesions were observed in sheep No. 7. In sheep No. 5 the duodenum was moderately congested. The kidneys of sheep Nos. 7, 8, 9, and 10 showed a few scattered petechial hemorrhages. It

*Dr. Jerstad transferred to Food and Drug Administration November 1, 1938.

is possible that some or all of these lesions were due to the drug; however, in view of their sporadic appearance it seems doubtful that the drug alone was responsible for all of them. Microscopic pathological studies have not been made as yet.

Discoloration of the urine is commonly associated with phenothiazine medication. The urine of sheep treated with phenothiazine is usually of normal yellow color when first eliminated, but after exposure to the air it becomes dark red. Accordingly, the floor of the pen where the test animals were confined became red stained, and because of this, it could have been concluded erroneously by those unfamiliar with the effects of the drug that the kidneys of the treated animal had been injured to such an extent as to cause the appearance of blood in the urine. However, the red color of the urine in treated sheep is due to a dye derived from phenothiazine by oxidation. This dye is closely related to methylene blue (DeEds *et al.*, 1937[8]). Like methylene blue, the dye in question may be reduced to a colorless compound in the body, and in the presence of free oxygen the colorless compound may be oxidized to form a red-colored dye.

Discussion

The data presented in this paper show that commercial phenothiazine administered to sheep at a dose rate of 0.5gm per pound of body weight was effective for the removal of nodular worms, and that this chemical was moderately effective for the removal of hookworms. The methods used were not adequate to determine the exact efficacy of phenothiazine for the removal of stomach worms of the genera Hæmonchus and Ostertagia, but the available data suggest that the drug was 100% effective for the removal of Ostertagia and about 80% effective for the removal of Hæmonchus. As the chemical is light and bulky only a small amount of it can be packed in a capsule suitable for administration to sheep. Therefore, to give an adequate dose of phenothiazine to a sheep by the capsule method, it would be necessary to administer so many capsules that the operation would

become impractical. For this reason, an attempt was made to administer the drug in a mixture of feed which the animals would consume readily. Some sheep consumed the commercial phenothiazine in a short time when it was mixed with bran, oats, and molasses, but other sheep did not consume a sufficient quantity for one or more days. Possibly the difficulties of administration may be overcome by placing the powder directly in the sheep's mouth; a practice that is followed commonly with various medicaments in South Africa. The purification of the commercial phenothiazine available at the present time may make possible a simplification of the method of administration. Work along these lines is now in progress.

Summary

1. Commercial phenothiazine, which contains about 95% of this compound, removed 76.7% of the hookworms and 90.9% of the nodular worms from eight sheep, when the substance was administered at the rate of 0.5gm per pound of body weight.

2. Commercial phenothiazine at a dose rate of 0.25gm per pound of body weight was much less effective in two animals than when given at a dose rate of 0.5gm per pound of body weight.

3. The chemical appears to have been 100% effective for the removal of Ostertagia and fairly effective for the removal of Hæmonchus.

4. A practical method for the administration of phenothiazine to sheep has not been developed, but further work in this direction is in progress.

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NEW DORMITORY AT L'ECOLE NATIONALE VETERINAIRE D'ALFORT

On the writer's first visit to the Alfort veterinary school 25 years ago, he was struck with the outward resemblance to a correctional institution as such institutions were operated in America. The campus was walled and the gates could be opened only by a gate keeper who looked very much like a guard. Students entered the school solely for the serious business of studying veterinary science. They were accepted only after their application was approved by the French government and, once enrolled, were subjected to a discipline as strict as that in the American army. They could leave the walled enclosure only upon written permission, which could be obtained only for the most valid reasons. There were no evenings in Paris or week-ends on the Riviera or afternoons at the races at Longchamp to be looked forward to. The college buildings, too, lacked the invitational aspect of many windows, even then a feature of American colleges. However, it appeared that the isolation of the institution was giving way, since visitors were admitted by applying to the head of the school only a few days in advance and giving a sufficient reason for wishing to visit the institution. Huidekoper, writing of his experience on a visit to the school in 1881, stated that his application had to be made through the American ambassador in Paris, and that several days and some official correspondence and interviews, particularly with the Prefecture of Police for the Department of the Seine, were necessary before permission was forthcoming.

Now all appears changed. On the occasion of a visit by a group of American veterinarians enroute to the XIII International Veterinary Congress last summer, the massive keys of the concierge, a pleasant woman, were turning in the lock even as she asked our names and wishes. Inside the grounds, everything was cordiality. Faculty members applied themselves so successfully to our entertainment and instruction, that what was planned for a one- to two-hour visit extended from immediately after lunch till well after six o'clock. Conditions for the students seemed completely changed. Now there is a summer vacation as at American colleges. The splendid new dormitory shown above is outside the campus enclosure and luxurious in arrangement, with a separate room for each student and all manner of athletic and recreational facilities in the basement. The unusual amount of window space in the walls is apparent.

Differentiation of Lymph-Gland Lesions in Swine

Differentiation between the lymph-node lesions of porcine hemorrhagic septicemia and those of tuberculosis and anthrax concerns practitioners, particularly those in practice in anthrax regions. Although there are variations, the lesions in the main are as follows:

Tuberculosis. — The lymph-gland lesions of porcine tuberculosis are either cellular, necrotic, caseated and calcified, or cellular, necrotic, caseated, fibrous and calcified. The length of time required for the lesion to pass through the various stages probably depends upon the virulence of the infecting organism and upon the resistance of the infected animal. Why some tubercular lymph glands become fibrous has not been determined. Involved glands, regardless of the stage of progress of the lesion, are tumefied and enlarged. In some tubercular glands the proliferated fibrous tissue occurs in bands that radiate from the center of the gland to its margin, the whole resembling the trunk and branches of a tree; hence the name "arbor vitæ" lymph gland. Porcine tubercular lymph glands are usually grayish-white in color. These lesions are practically non-vascular and are, therefore, devoid of congestion and hemorrhage.

Hemorrhagic Septicemia. — The lymph glands of swine dead of hemorrhagic septicemia are tumefied, usually edematous, congested and hemorrhagic. The intensity of the lesions vary according to the duration of the disease. In acute cases the tumefaction is not extensive and the congestion and hemorrhage are usually not well marked. There may be small, punctiform hemorrhages in the cortical portion of the gland, with or without a diffuse subcapsular hemorrhage. In other cases there may be diffuse hemorrhage throughout the structure of the gland. The color of the lymph gland varies from pale red to dark red, depending upon the extent of hemorrhage.

Anthrax. — The lymph-gland lesions of porcine anthrax are variable according to the progress of the disease and whether it is acute or chronic. In the beginning in acute cases the lymph glands are tumefied, congested and light red in color. As the disease progresses, the gland becomes greatly enlarged, extensively hemorrhagic and dark red in color. It soon becomes necrotic and brown or gray in color. On incision the gland is moist in the beginning but later becomes dry. As the disease progresses, the necrotic foci become encapsulated, and if the necrosis is extensive, the entire gland becomes encapsulated.

In chronic cases of anthrax the lymph glands are enlarged and show small hemorrhagic foci which later become necrotic and encapsulated.

Summary.—The outstanding lymph-gland lesions of porcine tuberculosis are: necrosis, caseation and calcification, and in some cases fibrous proliferation (arbor vitæ glands). Those of porcine hemorrhagic septicemia are: congestion and hemorrhage; necrosis is limited if it occurs at all. Those of anthrax are: marked tumefaction, hemorrhages, necrosis and encapsulation of the necrotic foci.—*A. T. K.*

Nightshade Poisoning of Swine

Introduction. — Nightshade poisoning is caused by various plants belonging to the family Solonaceæ, which includes such common plants as tobacco (*Nicotiana tobacum*), potatoes (*Solanum tuberosum*), and the plant from which atropine is derived (*Atropa belladonna*—deadly nightshade).

However, the case of poisoning described in this report was caused by *Solanum nigrum* (black nightshade), which is not a common cause of serious loss to the livestock industry. It may be diagnosed after exclusion of an infectious cause, by taking the symptoms into account, eliminating the possibility of other poisons, and finding the plant in sufficient abundance in a place where the animals have access to it.

Cases of poisoning have been reported in calves, sheep, goats and swine, and in children.

Description and Distribution.—Solanum nigrum is an annual; low-branched, often spreading, with a glabrous or hairy stem, ovate leaves, white flowers in small, umbrel-like drooping clusters, and black, globose berries. It is found in the northern United States and in Europe. It grows in shady grounds and fields, and is considered a cosmopolitan weed.

Toxicity.—This plant is occasionally cultivated for its fruit, which is used for pies, jellies, and the like; it should, however, be used with caution and only when ripe, as the green berries are more toxic.

The toxicity of this plant is due to the presence of the alkaloid solanine ($C_{52}H_{97}NO_{18}$), which has a hot, bitter taste. It is present in the unripe fruit, in quite large amounts under certain conditions, and in the leaves to some extent. The amount of solanine present varies, apparently under the influence of growth conditions, e.g. climatic conditions and the character of the soil. The plant grows most frequently in shaded areas, but when found in open fields exposed to the direct sunlight it seems to be more poisonous, though the reason for this is not clear. In general, the more musky-odored the plant, the more poisonous it is.

Animals do not show any particular fondness for black nightshade, and do not eat it to any extent if there is other food available. On the other hand, it does not seem to be particularly repulsive to them, since they will eat it in sufficient quantities to poison them when good feed in the pasture is scarce.

Case Report.—On the morning of August 22, 1938, the writer accompanied Dr. W. L. Derrer of Mt. Carroll, Ill., on a case which was diagnosed as nightshade poisoning.

The owner had lost about 40 hogs weighing around 60 to 70 pounds. They had been vaccinated against hog cholera 14 days previously, and were still being fed a reduced ration. They appeared to be doing well until they were turned into a field from which the farmer had threshed the oats, about three days previously.

Two hogs were showing symptoms when we saw them. The mucous membranes were slightly congested; the pulse was fast and weak; the temperature was normal. According to the farmer, the hogs which had died showed stupefaction, staggering, loss of consciousness and convulsions, followed by death in a very short time.

Post-mortem examination revealed only a slight congestion of the mucosæ of the stomach and small intestine. Many green berries were found in the stomach, along with an abundance of other green feed.

To exclude the possibility of a hog cholera break, even though the hogs had been vaccinated two weeks previously and no lesions suggestive of cholera were found post mortem, the temperatures of several of the animals were taken; all were normal.

All the evidence seemed to point to poisoning. No cause could be found in the hog lot. The oats field was then examined; it was found to contain very little feed except oat stubble and weeds. The weed in greatest abundance was found to bear the same green berries found in the stomachs of the dead hogs, and this plant was identified as *Solanum nigrum.*

Removal of the remaining hogs from the oats field checked the deaths in the herd.

N. H. CASSELBERRY, K.S.C. '39

Manhattan, Kans.

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Arsenic Poisoning in Hogs

April 16, 1939, the carcasses of two hogs, weighing approximately 150 pounds each, were presented at the veterinary clinic of Kansas State College for post-mortem examination. The following history was given:

The owner, who has the garbage contract of a small city, had fed the hogs garbage at noon the preceding day. Soon after eating, the hogs began to vomit and later refused to eat more. Forty hogs died during the night, and seven more the next day. No treatment had been administered.

Post-Mortem Findings.—Stomach and small intestine: the mucous membrane was highly congested. Erosion of the superficial layers of the mucosa had caused hemorrhage, the blood escaping into the lumen and mixing with the contents.

Urinary bladder: a few petechial hemorrhages on the mucous membrane were observed.

Heart: there was a profuse, subendocardial hemorrhagic condition.

A tentative clinical diagnosis of acute poisoning was made. Samples of the intestinal contents and of the garbage were sent

to a laboratory for chemical examination. Arsenic was discovered in both samples, in the amounts of 30 to 40 grains per pound of garbage and 1/10gr per pound of intestinal contents.

JOSEPH R. MASSEY, K. S. C., '39.
Manhattan, Kans.

Orchitis of Boars Following Vaccination

Orchitis is a rather common malady in swine. Practically all cases that have been reported have occurred in breeding swine. Most commonly, orchitis in breeding boars has been due to excessive use and a general disregard of sex hygiene; an occasional case has been caused by *B. abortus*, and rarely to the tubercle bacillus.

Veterinarians in meat inspection service occasionally report the findings of tubercular lesions in the testicles of boars slaughtered at abattoirs. Some inquiries received from practicing veterinarians indicate the occurrence of orchitis in boars after vaccination with anti-hog cholera serum and virus. A case of particular interest was one in which a valuable, purebred boar was treated simultaneously with anti-hog cholera serum and virus when about six months of age. This boar was found later to be a very irregular and uncertain breeder, this condition being due apparently to an orchitis that occurred soon after the vaccination.

Recognizing the significance of the possibility of inducing an orchitis in breeding boars by the use of anti-hog cholera serum and virus, several inquiries have been made as to the frequency of this condition succeeding vaccination.

In this connection the following report is of interest. A carload of boar pigs, weighing from 100 to 125 pounds, was vaccinated with anti-hog cholera serum and virus, and orchitis occurred in practically every pig within a few days after vaccination. This particular carload of pigs was purchased in the public market, there being a few obtained and vaccinated each day until the entire carload of some 150 head had been obtained and vaccinated. The time required to accumulate this load of pigs was about two weeks. The veterinarian that did the vaccinating reported that in practically every instance each pig vaccinated developed a severe orchitis within three or four days after vaccination. A hog feeder with whom I discussed this problem stated that several instances had come to his attention in which orchitis had developed after the simultaneous vaccination of boar pigs, and that in many instances the reaction succeeding the inflammatory process was so intense that the pigs were permanently stunted.

The usual symptoms shown in the cases of involvement of the gonads of the pigs as a sequel to simultaneous treatment with anti-hog cholera serum and virus are enlargement and an increased sensitiveness of the glands. The affected pigs have little tendency to move and have a diminished appetite or complete inappetence. The inflammatory process usually subsides in a few days, after which the testicles atrophy in most instances. An occasional case is observed in which there is abscess formation succeeding the inflammation, in which the testicular structure is destroyed. This condition is quite serious in breeding animals, as an inflammatory process of any of the sexual structures diminishes the breeding possibilities.

From the general information available, it has not been possible to ascertain the exact cause of the development of the inflammation of the sexual glands in pigs following the simultaneous administration of anti-hog cholera serum and virus. Most of these cases that have been observed and reported have occurred in pigs in which the serum was injected into the axillary space and the virus into the structures in the flank region or thigh.

We have no reports of the occurrence of orchitis following the intraperitoneal injection of the serum. This method of injecting the serum also obviates the injury to the ham and shoulder that sometimes occurs when serum and virus are injected into those structures. One case of orchitis has been reported recently in a boar that was

vaccinated with clear, sterile serum. The serum was injected into the axillary space and the virus into the femoral region.

This brief report is given with the hope that readers of VETERINARY MEDICINE will discuss it freely.—*A. T. K.*

* * * *

A Dietary Disturbance in Swine

November 23, 1938, a friend and myself were called to investigate a disease in some sick pigs at Carthage, Missouri. We found on our arrival a lot of six pigs, three months of age, confined in a crowded pen. One had died and two others were sick. A number of larger hogs, on free range, were apparently in good health.

The diet of the pen pigs consisted of wheat shorts, garbage slop, and tankage, in approximately equal parts. The pigs had started getting sick three days after tankage was added to the diet.

The sick animals showed a depressed appetite and difficult breathing. The temperature was 100.5°F. Hemorrhagic, edematous swellings were noticed about the head. The most prominent symptom was the presence of blush-red hemorrhagic areas, about the size of a silver dollar and of irregular shape, in the subcutaneous tissue.

Autopsies were performed on the animal which was dead when we arrived and on one that died a short time later. Extensive subcutaneous and subserous hemorrhages were present, with additional submucous hemorrhages in the mouth, pharynx and larynx, while the gums showed hemorrhages and ulcers. The bladder was entirely hemorrhagic, being filled with a large blood clot. The kidneys and liver were apparently normal.

From the diet, symptoms, and lesions, a diagnosis of protein poisoning was made. The owner was advised to remove tankage from the diet. Following this, no further cases developed and the remaining animal which had shown symptoms of the disease made an uneventful recovery.

H. J. CONRAD, K.S.C. '39
Manhattan, Kans.

The Round Table

How would you answer these questions?

10. *"This dog just got run over on the street. I don't know who owns him, so what will we do about it, Doc?"*
    (a) If the samaritan is coöperative.
    (b) If the samaritan is non-coöperative.
    (c) If the dog is licensed.
    (d) If the dog is not licensed.

11. *"How much do you charge to spay a female pup five months old? Why do you charge more than Dr. Chis Elm?"*

12. *"This dog sheds his coat all the year. How can I stop that?"* (phone call.)

13. *"Doctor, what makes my dog eat grass all the time?"* (phone call.)

14. *"Doc, what makes this pup chew up every damn thing he gets ahold of?"*

15. *"Doctor, my husband just brought home a two-month-old pup for the children; how do I go about housebreaking it?"*

Some may think that this and many of the foregoing questions have little to do with veterinary practice. Perhaps so, but one who doesn't answer them cheerfully and fairly satisfactorily will have little veterinary practice to do. A proper telephone manner is even more desirable than the much talked of "bedside manner."

16. *"How can I cure this dog of carsickness?"*

17. *"Doc, my cocker is a house pet and has never been bred. Will it spoil him as a house pet if I breed him? Will it ruin his health if he isn't bred?"*

18. *"You say this dog has dumb rabies. Is there any danger of his going mad and tearing things to pieces?"*

19. *"I think my dog has worms. He skids around on his hind end; that's a pretty sure sign of worms, isn't it?"*

20. *"How can I tell when this kitten comes in heat?"*

21. *"I have just come from Dr. C. R. Ockery's and I think he has been drinking. I certainly wouldn't leave my dog there."*

Pig Problems

By A. T. KINSLEY, Kansas City, Missouri

1. The disease in question has thus far been confined to cholera-immune, mature, brood sows that have been ranging in a sweet-clover pasture. All affected sows have suckling pigs. The first symptom noted consists of a tumefaction in the cervical or pectoral region. There is a disturbance in locomotion similar to lameness due to muscular rheumatism, which becomes more pronounced as the disease progresses. The appetite is normal in the beginning, but within 24 to 36 hours after the onset, affected individuals refuse feed and water. The temperature ranges from 101 to 103°F. Two have died and three others are affected.

The tumefied areas are permeated with varying quantities of coagulated blood. The odor from the tumefied areas is similar to the odor that characterizes blackleg tumefactions. There is more or less congestion, and hemorrhages in the heart and lymph glands. None of the suckling pigs have shown symptoms of the disease; even those that lost their dams remain healthy.

Is the condition blackleg or some other infection, or is this disorder the result of consuming sweet clover?

Suggestions from readers of VETERINARY MEDICINE will be appreciated.

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2. Recently, 131 spring pigs that were kept in a sweet-clover pasture were treated with serum and virus. There were 133 pigs in this lot, but two runts were destroyed prior to vaccination. All pigs were coughing more or less when vaccinated.

The owner reported seven dead pigs six days after vaccination and the following conditions were reported by the attending veterinarian. Several pigs were coughing, thumping, sneezing, also showing conjunctivitis, with temperatures up to 106.7°F. Three pigs were sacrificed and careful autopsies made, with the following findings: slight hemorrhages of the epiglottis, heart and lung, and one punctiform hemorrhage in each kidney; extensive congestion in anterior lobe of lung; slight infestation with lungworms and ascarids; spleen slightly enlarged and friable; a large "button" ulcer at the ileocecal valve, and several small ulcers in the mucosa of the large intestine.

Of the 131 pigs that were vaccinated, 14 have died, including the three killed for autopsy. These pigs were taken off the sweet-clover pasture when they began to sicken, and have been receiving a ration of buttermilk from a nearby creamery and a small quantity of corn.

The same serial number of serum and virus was used on other swine with splendid results. Is this a cholera break, or were the lesions due to vaccination? Of how long standing was the enteritis in the pigs on which the autopsies were made? What is the significance of the conjunctivitis? Did the sweet clover have anything to do with this outbreak? How should herds showing similar symptoms and lesions be treated?

Comments and suggestions from readers of VETERINARY MEDICINE will be appreciated.

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3. The following report concerns a litter of nine pigs from a mature sow that had produced four previous litters. The sow farrowed normally. All the pigs were apparently healthy. The sow was provided with 3½ pounds of mill feed daily. The general sanitary conditions were good.

The pigs were constantly attempting to nurse. They were weak; had a rough coat and were extremely emaciated. The udder appeared to be empty.

This condition, in our judgment, was agalactia. Th outcome is problematic. The chances for recovery are far better in a mature sow than in a young sow after the first farrowing.

We would suggest the use of maltine or malt preparation. Barley or fermented and ground barley slops have been reported of

value in these cases. The injection of placento-mammary extract is said to have given some encouraging results.

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4. This is a report of three litters, containing 16 pigs, produced by mature sows that weighed about 240 pounds each. These sows aborted their fall litters and there was a persistent discharge from the vagina for 30 days or more. They conceived only after breeding three or four times. Two or three pigs of each farrow died the first day after farrowing and there were two that showed persistent urachus. The sows were being fed on three pounds of ground oats along with some skim milk. Sanitary surroundings were good. The affected pigs showed a temperature of 106°F. They were lame and had swollen joints. Some had diarrhea and on autopsy there was evidence of inflammation of the liver and of inflammatory disturbance of some of the joints.

This condition was provisionally diagnosed as pyemic arthritis.

Treatment is not usually satisfactory because the pigs are so weak that they die before any effective remedial agents have time to benefit them. Perhaps one of the best methods of treating, where the value of the pigs justify, is to inject into the pigs blood obtained from the sow by tail-bleeding, since the sow's blood probably contains antibodies. This, in many instances, has produced very gratifying results.

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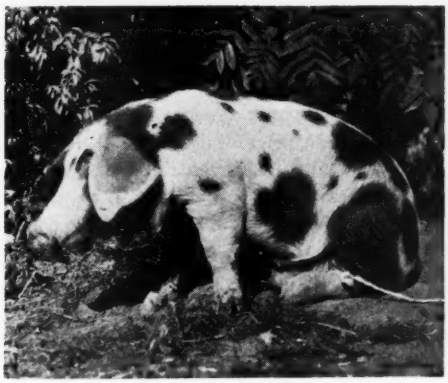
5. The following is an interesting report of six litters of 45 pigs, from one to five days old, farrowed by mature sows, weighing approximately 250 pounds. These sows were immune to cholera and there had been no abortions, nor had any dead pigs been observed at the time of farrowing. Each sow had been fed daily 10 pounds of mixed feed made up of: corn, six pounds; oats, two pounds; mill run, two pounds. Sanitary conditions were good, and no swine had occupied the lots previously.

The principal symptoms manifested were dullness, restlessness, colicky pains and diarrhea, in which the discharge was of pasty consistency. The pigs usually died quite promptly. Autopsy revealed more or less inflammatory disturbance of the intestines.

This condition is relatively common and is ordinarily designated pig scour. The



Streptococcic Septicemia

cause of the condition in this instance was probably excessive feeding of the sows, resulting in production of excess quantities of milk and gorging of the pigs. After the pigs' digestive functions have been deranged, microbian agents of various kinds enter in and become a factor in further reducing the vitality of the pig and causing their death. Treatment in such cases is not of much value. Pig scour can be prevented, we believe, in 90% of the cases by proper regulation of the diet of the sow. In attempting treatment, the first principle is to make sure that the sow has a proper diet. If the pig has sufficient resistance, it may be given castor oil to eliminate the offending material from the digestive tube.

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6. A litter of 14 pigs was farrowed by a mature sow that had 10 well developed mammary glands. There had been no abortions. This sow had been properly fed, and the sanitary conditions under which she and her litter were kept were fairly good.

The first disturbance noted in this group of pigs was fighting for place, there being 14 pigs and only 10 teats. Three or four days after farrowing, eight of the pigs were dull and weak, refusing to nurse. On

closer inspection they were found to be champing their teeth; there was more or less salivation, and when the pigs were examined, it was found that the disturbance was associated with sores on the lips and in the mouths.

This condition is ordinarily known as stomatitis, one of the principal causes being injury due to fighting for place. So-called wolf teeth have little to do with the occurrence of this disease, in our judgment. The injuries incidental to fighting provide an avenue for entrance into which *B.necrophorous* and other microbian agents find a favorable nidus for their development.

The treatment for such cases, providing it is begun early, is usually successful. The most effective manner of controlling the disease is by curetting the lesions, removing the necrotic material and applying tincture of iodine. This process should be repeated daily until the infection has been conquered. This condition can usually be prevented by seeing to it that each pig has a teat. Sows farrowing more pigs than they have teats should have the litters reduced.

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7. This is an interesting report of 10 litters containing 75 pigs that ranged in age from five to 15 days. These pigs were farrowed by mature sows, with no history of abortion or of difficulty in breeding. The sows were being fed a slop made of three pounds of ground barley and sufficient buttermilk for each sow. These sows were kept in a permanent hog house and running on old lots; that is, on lots that had been used for several years for the yarding of swine.

The principal symptoms manifested by the pigs were thumping, coughing, dullness, and rough coat; although they had a fair appetite, the temperature in many instances was 105°F. or more.

On post-mortem examination of affected pigs, hemorrhagic centers were found in the lung and there was also evidence of embolic pneumonia.

This condition, in our judgment, was due to parasitism, the offending parasite being the larval form of the ascarid.

Ascarid infection can be effectively prevented by proper scrubbing of the sow a few days before farrowing and then placing her in a clean, disinfected farrowing lot.

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8. The following is a detailed report of 18 litters of 97 grade, big type, Poland China pigs farrowed and maintained in a permanent hog house. The sows were provided a full ration of corn and cistern water during pregnancy and for a period of six weeks after farrowing. Three of the sows broke down in the back and died later, probably from infection of decubital sores.

The symptoms noted in these pigs were lameness, weakness, depraved appetite and diarrhea. There was bending and arching of the legs with bony enlargements. Extensively affected pigs lay on their bellies and expressed pain by squealing when made to move.

Autopsy findings consisted of enlargement, particularly at the end of the long bones, and a thickening of the flat bones of the head and pelvis. The bone marrow varied from normal to a mass that was red in color and of a gelatinous consistency. The affected bones were usually so soft and spongy that they could have been cut with a knife; there was a spongy layer beneath the periosteum. The nares and mouth cavity were practically obliterated by the enlarged, rarefied, nasal bones and hard palate. In some cases the alveoli were swollen and the teeth appeared deep set.

The diagnosis of this condition should not be difficult if the history, symptoms and lesions are taken into consideration. The condition is not tubercular; neither is it paralysis; but it does not fulfill the requirements of rachitis or rickets.

Treatment of rachitic swine is advised only in the early stages of the disease. The affected individuals should be placed in comfortable, sanitary quarters and provided with a ration containing extra quantities of lime salts. The addition of cod-liver oil in quantities of from two to four ounces daily, for hundred pound pigs, and phosphates in half-ounce to ounce doses

have given good results in most instances when the treatment was begun early. Green foods are of considerable value in these cases. Yeast has been lauded as a valuable adjunct by some veterinarians.

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9. Another interesting report concerns 19 pigs, from three sows that had farrowed and were maintained on premises that had been used for swine for the past several years. According to the history there were a few shotes two years prior to that time that had distorted noses and irregular bulging of the facial bones and several pigs had been destroyed in the last year because of an ailment affecting the nose.

These conditions are rather prevalent and are responsible for the loss of large numbers of pigs, particularly in the older farmed sections in the corn belt.

The first symptoms noted in this herd, consisted of sneezing, followed within a few hours or a few days by a nasal discharge that was thin and watery in the beginning and later became purulent or mucopurulent. The affected pigs had a tendency to root in their feed, but ate little, and consequently did not gain in weight. In some of the cases there was a mucous or mucopurulent discharge from the eyes and in a few instances the eyelids were closed. Within the course of two to four weeks, there was noted a bulging of the facial bones which interfered with breathing so that the affected pig made a peculiar, blowing noise. This condition is what is ordinarily termed bull nose, technically known as infectious rhinitis. It is possible that *B. pyocyaneus* may be the active cause. The disease is invariably found in pigs that are maintained on soil on which swine have been kept for several years.

Inbreeding may also be a factor in the occurrence of the disease. When the infection once occurs on a farm, unless extraordinary precautions are taken, it will persist and become more prevalent from year to year. Its first occurrence on the premises usually involves only a small percentage of the pigs; within two or three years it is not unusual to find 20 to 25% of the pigs affected.

The principal lesion observed on postmortem examination consists of a catarrhal inflammation of the nasal mucosa in the beginning. Later there is a purulent inflammation and variable areas of the mucosa may be destroyed. Bulging of the facial bones is a manifestation and the rarefying osteitis produces more or less deformity. In some cases the enlarged palate encroaches upon the oral cavity.

Treatment of this condition is not successful unless initiated in the very early stages and even then some of the cases cannot be relieved. Treatment that has been most successful consists of inhalation medication of some volatile agent, such as eucalyptol oil. Treatment should not be attempted in those cases in which there is involvement of the facial bones. The disease can usually be prevented by providing sanitary pens, and properly ventilated hog houses, combined with proper swine management, and particularly by seeing to it that inbreeding is not too intensive.

Dioctophyme Renalis in a Dog

By N. B. MOORE and M. A. SCHOOLEY,
Kinston, North Carolina

ON the afternoon of March 1, 1939, a client brought in for examination a white, male, American bulldog, six years of age and weighing approximately 70 pounds.

History.—The owner had not been in possession of the dog for three years, but of late had had it at a boarding kennel. About a week prior to March 1st she had reclaimed it, being of the opinion that it was not being properly cared for, since it had lost weight and was not as active as it had been. She had also noticed intermittent bloody feces and lack of appetite.

Symptoms.—The mucous membranes of the mouth and conjunctivæ showed a severe anemia. Long strings of saliva hung from the mouth. A temperature reading of 100.5°F. was taken. A perfunctory examination of the abdomen revealed only a small amount of sensitiveness. A fecal examination eliminated hookworm *(Ancylostoma caninum)* as a cause of the anemia.

The dog was held for observation. The following morning it was turned out of the kennel for exercise and was fed a quarter of a pound of raw, ground beef. Before returning to the kennel it drank a quantity of water. A few minutes later it fell over dead. Blood passed from each nostril.

Post-mortem Findings.—On making a midline incision into the thoracic and abdominal cavities the larger of the two specimens of *Dioctophyme renalis (Eustrongylus gigas)* shown in the illustration was the first thing noticed. It was unattached in the abdominal cavity. The liver was covered with pits and small, white, calcified areas of about the size of the lead in a lead-pencil, the right quadrate lobe showing more calcification than the rest. The diaphragmatic portion of the liver showed adhesions to the diaphragm. The diaphragm was perforate and showed signs of degeneration. At this point a rupture of the liver had occurred; the hemorrhage had escaped into the thoracic cavity, filling it with blood. The smaller of the two parasites was found unattached in the region of the liver. A fistulous tract running from the fundus of the stomach to the liver revealed a partly-corroded sewing needle. The spleen was normal in size.

The intestinal tract showed a heavy infestation of tapeworms (*Tænia pisiformis.*) The right kidney had undergone a complete degeneration and was covered with calculi about the size of a match-head. The right kidney was incised and revealed a heavy deposit of calculi in the pelvis and collecting tubules. The left kidney showed scattered calculi on the cortex and had undergone compensatory hypertrophy. The bladder was greatly thickened and the mucosa was studded with ecchymoses.

The thoracic cavity, as stated, was filled with blood. The lungs showed some congestion. The heart was flabby, but normal in size; the auricles, however, were extremely thin and, as stated before, the diaphragm in the region of the quadrate lobe of the liver had undergone degeneration, leaving a large aperture connecting the abdominal and thoracic cavities.

Discussion.—It is a common belief of rural laymen in this locality that if a dog is bitten by a poisonous snake and recovers,

Upper left: the liver with the degenerated portion of the diaphragm attached, the calcified right quadrate lobe of the liver being removed and to the right. Upper right: the incised bladder, with the mucosa exposed. Lower left: the right kidney incised, showing the calcified area, and the left kidney. Lower right: the two specimens of *Dioctophyme renalis*. The needle is between the kidney and the liver.

DIOCTOPHYME RENALIS
Fig. 1. The egg.
Fig. 2. Adult form.

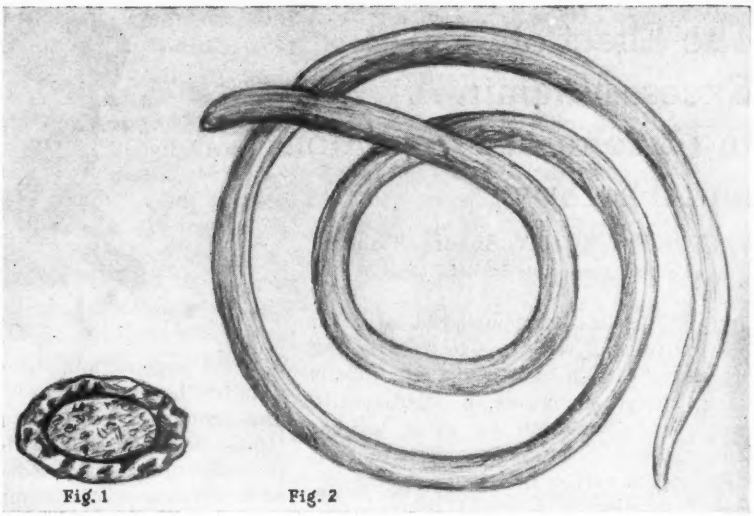

Fig. 1 Fig. 2

snakes will develop in the abdominal cavity and finally cause the death of the animal. This is based, no doubt, upon finding the *Dioctophyme renalis* in post-mortem examination of dogs that had died from mysterious causes.

The female found in this dog measured 33 inches in length and the male, 14. They were blood red in color. According to the literature, the exact life cycle of this parasite is not known, but the infective stage probably occurs in fish, since the occurrence of the infestation has been definitely associated with the eating of raw fish. Presumably the fish is an intermediate host. In the mammalian host, the right kidney appears to be invaded more frequently than the left. The worms apparently enter the pelvis of the kidney and destroy the surrounding tissue. Calcification may occur. The worms may be found free or encapsulated, and quite frequently lie between the lobes of the liver. They may also be found in the pleural cavity. The parasite has been reported in the dog, fox, otter, leech, martin, polecat, mink, weasel, seal, horse, pig, cattle and man.

The death of the dog in this case was caused by internal hemorrhage due to rupture of the liver, which was probably caused by attachment of one or both worms in that region. The calcification was no doubt due to the destruction of tissue by the worms, or by hemorrhage caused by the worms, and represented the body's effort toward a reparative process, the lime salts taking the place of the destroyed tissue. Apparently the worms had attached themselves many times, especially in the region of the liver and kidney, evidently traveling all over the abdominal cavity, as shown by the pits upon the liver and small calculi on both surfaces of the kidneys and liver.

The anemic condition of the dog may have been due to repeated loss of blood in the feces, to repeated internal hemorrhage, to a hemotoxin elaborated by the parasite, or to all three.

Not enough is known of the life cycle of the parasite to approach the therapeutic side of the problem intelligently. As shown in this case, the parasite is capable of causing involved pathological changes in many organs of the animal, which finally result in death. If the intermediate host is the fish or (seal), then removal of these articles from the diet of the dog is indicated as a prophylactic measure. If the condition is suspected before too many pathological changes have occurred, then an exploratory laparotomy and removal of the parasite might result in recovery.

The Effect of Excess Vitamin A in Distemper Prevention and Therapy

By LEON F. WHITNEY, Auburn, Alabama
Alabama Polytechnic Institute, Class of 1940

SO MUCH has been published lately on the value of vitamin A in treating and preventing certain human ailments that it was decided to undertake an experiment to endeavor to ascertain its value in distemper. Some loose statements have been made to the author by laymen, to the effect that vitamin A would prevent distemper. Certain scientific workers have expressed the belief that possibly the vitamin would prove efficacious in the treatment of dogs suffering from the malady.

Since the exhibition of a number of dogs at dog shows was contemplated, and since there were in the kennels, among others, 30 untreated bloodhound puppies, 22 of which were three months old (supposedly too young to receive the first injection of vaccine in the Laidlaw-Dunkin prophylactic treatment), and the other eight, five months old, it was decided to give large additional doses of vitamin A to these puppies in order to protect them if possible in the event that distemper should spread throughout the kennels.

Beside the bloodhounds there were a great many other puppies in the kennels, including one litter of 14 three-month-old bullhounds, as well as many dogs which had been immunized by the Laidlaw-Dunkin method or by variations of the recommended doses of that treatment. It was decided to use the bloodhounds because all of them were distinctly similar in genetic origin. Further, the bloodhound is one of the least resistant breeds known to the author. This feature has stood out in the results of outbreaks of distemper in my kennels during many years. Several outbreaks have completely wiped out litters of these puppies, and the mortality in old dogs has been very high—this, despite liberal prophylactic use of anti-canine distemper serum from hyperimmunized dogs. Probably no better breed could be found on which to conduct distemper experiments. If there is any breed where natural resistance to the disease is low, this is it. In making the tables for his study on coat color inheritance in scent hounds, the author was astonished to find that he had actually bred 888 bloodhounds,[1] and more astonished to realize how few of them were alive today.

■ The 30 puppies decided upon for this experiment were from four litters. Some puppies had been sold from each. They were maintained in four pens. All were fed a diet known to be more than adequate in all vitamins, as revealed by assays and practical feeding tests. To this diet, for puppies in two of the pens, was added very close to 2000 units of pro-vitamin A (as carotene) per puppy twice a day. The puppies in the other two pens were fed the same diet but instead of carotene, cod-liver oil concentrate was fed at a level of 2000 units of vitamin A per puppy twice a day. This group also received additional vitamin D with the oil. It should be emphasized that this was in addition to a diet already more than ample in vitamin A.

All the puppies had been receiving the vitamin additions for two weeks when a dog sick with distemper was introduced into the kennel. Every unprotected dog in

[1] How to Breed Dogs, New York, Orange Judd Publishing Co., 1937.

the kennel except two eventually contracted the disease. Those receiving carotene and cod liver oil concentrate contracted the disease as readily, so far as could be seen, as did the controls on the diet already adequate, but without the carotene or cod liver oil concentrate. Of the 30 receiving the supplement, all died. Of those of other breeds which did not receive additional vitamin A, about half died.

As soon as it was clear that the puppies were sick and were losing condition, four of them were treated each day with intramuscular injections of 2cc of carotene in oil. These showed no greater resistance than the controls.

Incidentally, the litter of 14 bullhound puppies which had the disease at the same time as the bloodhounds, had so much greater vitality that on the same diet, without the vitamin A supplementation, but with identical treatment in every other respect, only three died and the rest had comparatively mild attacks. Only three of those which lived were seriously ill.

■ The conclusion is that vitamin A, as a preventive of distemper and as a therapeutic agent, has little if any value. But it should be noted that a comparison was not made between a diet completely devoid of, or low in vitamin A and one rich in it, but rather between one already adequate and one rich in vitamin A.

■ These results are so different from those obtained by Frohring[2] that it is difficult to account for the discrepancy. In my experiment, diet would seem to be ruled out since the diet, both with and without supplementation, was more than adequate in vitamins. Frohring gave dry yeast up to 10% of the dry weight of the food. There was no yeast in the diet I fed, but there was far more of vitamins B and G than a dog could utilize.

In feeding experiments, some of which had been terminated by distemper invasion in the kennels, I have been feeding diets with as much as 3% dry yeast, and many times, diets with as much as 1% dry yeast, and these had no value in the prevention or cure of distemper. The diet of 10% used by Frohring would scarcely seem practicable in dog feeding. My comparative results would seem to rule out the vitamin A in large doses, as a distemper preventive, and if there is any credit to be given diet it must, I should think, be ascribed to the additional 7% of yeast in Frohring's diet and something in the B complex. That seems hardly reasonable, for a dog receiving 3% of dried yeast is getting far more than he can utilize, especially when the 3% was in addition to a diet already adequate in the vitamins furnished by the B complex.

■ That the disease with which I was dealing was genuine distemper, there can be no doubt. Ferrets were injected with spleen suspension made from dogs that died, and they became infected. Other puppies were injected with it later and they too became infected. Spleens were stored, and vaccine made from them and injected into puppies later on, afforded complete protection, when the two doses of vaccine were followed by a small dose of unformalized spleen suspension. Each puppy had a typical case of distemper of very short duration and of mild nature. Many exposures of some of these puppies since their immunization, have demonstrated they are no longer susceptible.

■ Much has been made of the fact that distemper takes two principal forms. In these puppies the symptoms were mixed. The eyes and nose ran freely; the bowels were loose and often evil-smelling excreta were voided; there were profusely hacking coughs, and in many cases pneumonia followed or complicated the picture.

So far as resistance to infection was concerned, there was no difference between the puppies which received the large doses of vitamin A and those which did not.

[2] NOTE.—The explanation seems to lie in different conditions discussed. The writer was dealing with true distemper due to Carré's virus; Frohring with a condition indistinguishable clinically from the virus disease but in which there was no Carré's virus present. Frohring's conclusion was that vitamin A deficiency plus the secondary invaders common to distemper produce a disease clinically indistinguishable from distemper due to Carré's virus, and that this affection in dogs can be prevented by a diet rich in vitamin A.—ED.

Record of a Bang's Disease Reactor

The case of a high-grade, Holstein cow, belonging to Mrs. M. M. Schweiger of Lenexa, Kans., is worthy of mention. The cow is 15 years old, has given birth to 12

Mrs. Schweiger with her remarkable cow

normal, healthy calves, produced approximately 160,000 pounds of milk containing approximately 6,000 pounds of butter fat, and is still producing. She was bought as a coming three-year-old and placed in an abortion-free herd; calved within a few days and retained the afterbirth. She was then blood tested and found to be positive in three dilutions. This cow possessed such unusual milk-producing qualities that she was retained in the herd and vaccinated with live culture vaccine at the time the afterbirth was removed, and revaccinated when known to be pregnant. She has remained continuously in this negative herd up to the present time, and is still a positive reactor in a dilution of 1:100. No other member of this herd has ever given a positive reaction to the agglutination test.

The cow has never been sick a day, except for one attack of milk fever and the one retained afterbirth already mentioned. She has received a thorough physical examination every 30 days for the past 12 years and has never shown any indication of mastitis, and after all these years possesses as nearly a normal udder as can possibly be found on an aged cow. She fell on the ice two winters ago and injured the right acetabulum, and has been lame ever since. Despite the lameness, and without a tooth in her head, she is unusually thrifty; being fed only ground feed and good ensilage.

This cow with such an unusual milk record is only one of many cows with somewhat similar vaccination records. All of which supports my contention that a vaccinated cow does not spread Bang's disease, although it may have been a highly dangerous spreader before being vaccinated.

Handling Bang's disease to the greatest advantage to the owner is, as the Rev. Jeff Henry[1] says, a job for someone that knows what he is doing. "Kill 'em" may be, and sometimes is, the best advice, but for me to say it by rule would be failing to make use of a course in college and 30 years' experience in practice. The "man whut knows", to revert to the patois of the Rev. Jeff Henry, is not afraid of responsibility. "Dat's de diffeunce."

S. L. STEWART.

Olathe, Kan.

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The veterinary division at Michigan State College was established as a result of an act of the legislature, Public Act No. 97, May 22, 1907. The first graduate, Dr. Louis A. Wileden, of Mason, received the degree in 1913. The total number of graduates during the ensuing two decades, including 1933, was 160, about an average of eight. From 1934 to 1938 inclusive, the number of graduates has been 117, about an average of 23. The enrollment for this term is: preveterinary, 79; first-year, 54; second-year, 62; third-year, 58; fourth year, 33, a total of 286.—*Ward Giltner.*

[1] Burson, W. M., "De Diffeunce When a Man Knows," *Vet Med.*, 34:5, p. 267.

Abstracts

An Instrument for Taking Blood Samples

The needle is screwed to the center of a metal plate measuring 25mm in diameter[55]. At right angles to the edge of this plate a metal half-cylinder 100mm long is soldered, in which the sample tube is placed when in operation. The half-cylinder with the tube constitutes an excellent handle. Under optimal conditions and with proper assistance the new instrument will enable the veterinarian to take as many as 100 samples per hour.

Aujeszky's Disease

Galloway[58] brings together and reviews the available information on Aujeszky's disease; his article should be read in the original. Aujeszky's disease and rabies have little in common except that both are produced by filterable viruses and cause symtoms referable to lesions in the central and/or peripheral nervous system. The itch symptom does not occur after intracerebral inoculation, and in the case of infected pigs it is absent. The disease in pigs appears to be relatively mild, though highly contagious. It does not seem to be contagious among small laboratory animals. Horses, dogs, cats, cattle, sheep, pigs and rats have become infected under natural conditions. In dogs it is rapidly fatal. Occasionally, humans have accidentally acquired infection in a mild form. Cats and rabbits are very susceptible to small doses of virus. Among cattle and sheep the disease is reported to be fatal, but not contagious. The means of spread are not clear. Transmission by subcutaneous inoculation or by the bite of an infected animal does not readily take place. Negri or similar inclusion bodies are not found. Pigs and monkeys and, to a lesser extent, guinea pigs, are more resistant than cattle, dogs and rabbits. The serum of recovered pigs can neutralize the virus. The existence of outbreaks has been proved experimentally in Hungary, Austria, France, Russia, Rumania, Denmark, Tunis, North and South America, Holland, Spain, and Yugoslavia. Clinical evidence indicates the possible existence of the disease in the British Isles, Switzerland, and Germany.

[55]Bendixen, H. C., 1938. Instrumentarium til Udtagning af Blodprover. *Medlemsbl. danske Dyrlaegeforen.* 21:159-162. Abst. in *The Vet. Bul.* by Gustav Naerland.

[58]Galloway, I. A., 1938. Aujeszky's Disease. *Vet. Rec.* 50:745-762. Abst. in *The Vet. Bul.* by J. A. Griffiths.

The Toxicity of Oil of Turpentine

Drenching experiments with mixtures of raw linseed oil, oil of turpentine, and extract of male fern were conducted upon horses and rabbits[54]. The following mixture appeared to constitute no danger to full-grown horses in fair condition and in good health: 120cc (four oz.) of oil of turpentine, 4cc (one dram) of extract of male fern, and 600cc (one pint) of raw linseed oil. Contraindications are congestion of the kidneys, nephritis or gastroenteritis. The toxic doses, symptoms of poisoning, post-mortem appearances and treatment of cases of oil of turpentine poisoning are discussed.

Sarcocysts in the Central Nervous System of Sheep

Brownlee[44] described cysts found in the central nervous system of a group of ten sheep on which an autopsy was performed for other experimental purposes. Morphologically, the cysts showed characters strongly resembling those of the genus Sarcocystis. The spores also closely resembled those of *S. tenella*, except that they appeared to be slightly larger. Brownlee considered it unlikely, however, that the cysts were those of *S. tenella* because of the unusual site. The only previous record of the presence of sarcocyst-like organisms in the central nervous system of sheep is that of Zurn, who found two cysts of *Balbiana gigantea* (now included in the genus Sarcocystis) under the cerebral dura mater of sheep.

[54]Steyn, D. G., 1937. The Toxicity of Oil of Turpentine for Domestic Animals. *Onderstepoort Jnl. Vet. Sci.* 9:591-598. Abst. in *The Vet. Bul.*

[44]Brownlee, A., 1936. An Organism Showing the Characters of the Genus Sarcocystis Present in the Central Nervous System of the Sheep. *The Jnl. of Comp. Path. & Ther.* 49:3.

Book Review

INDEX OF DIAGNOSIS (Clinical and Pathological) for the Canine and Feline Surgeon, with Treatment. *By Hamilton Kirk,* M.R.C.V.S., Major Royal Army Veterinary Corps (T.A.); Member British Institute of Radiology; Lecturer on Animal Management, London County Council; Official Veterinary Surgeon to Clapton Greyhound Stadium, with the collaboration of *Gerry B. Schnelle,* V.M.D., Surgeon to the Angell Memorial Animal Hospital. Cloth bound. 561 pages, illustrated. The Williams & Wilkins Company, Baltimore, 1939. $9.00.

"Inasmuch as it is the writer's primary concern to aid the practitioner in differential diagnosis, he has not delved deeply into symptomology except to enumerate such objective signs as are characteristic of the condition under review, and which therefore become of importance in differential diagnosis."—*Extract from the preface.*

The plan of this book departs somewhat from that heretofore adopted for scientific veterinary texts, although it has been used in non-technical treatises on diseases of animals and man. Instead of discussing the pathology of important organs or related organs, as the liver or the central nervous system, the author has selected outstanding symptoms, such as "Abdomen, General Enlargement," and under that heading listed the ailments or other conditions in which that symptom occurs, giving for each the further symptoms by which it is differentiated from others in the group. Thus in the instance mentioned ascites, adipose tissue, bladder distension, bladder rupture, exudative peritonitis, tumors, hair ball, intestinal obstruction, overloading the stomach, pregnancy, pyometra, tympanites, ventral hernia and worm infestation are given and the additional symptoms of each enumerated. In the case of pyometra and worm infestation the treatment also is discussed. In the former, one notes that spaying is not mentioned.

These key symptoms, such as abdominal pain, emaciation, lameness, paralysis, skin eruptions, thirst, etc., are arranged alphabetically. The indications for radiography, however, are all grouped under "x-ray diagnosis." This section of the work is illustrated with many fine radiograph reproductions from the author's own cases, which add much to the value of the discussion.

The author makes the following suggestions for the use of the book in arriving at diagnoses: "Upon examination of a patient, the most important or significant symptom should be noted, and the practitioner should then refresh his memory as to all the conditions which may be associated with or give rise to that symptom. The same procedure should be adopted in connection with the second leading symptom, and so on.

"It will usually be easy to decide (having regard to all the circumstances) that the animal's illness is inconsistent with a number of the diseases enumerated, which are at once eliminated from further consideration. The issue is thereby narrowed, and one may generally arrive at a final decision by reference to the remaining symptoms, and to the results obtained from examination of specimens of blood, feces, urine, etc."

This work is a very useful and welcome one in a field where it is much needed. The reviewer would have preferred the conventional arrangement and rather more discussion of the significance of the symptoms enumerated. However, that is a small matter; the information is given and the seeker can find it readily, if not in the expected location, then by reference to the index of the "index." A little more care in the selection of words, a somewhat more precise diction, would have made perusal more agreeable even if it did not add to the information the work contains. Thus we find the feces referred to as "motions," a fecal mixture or suspension called a "solution," to determine or to ascertain becomes "to know," Stuttgart disease simply "Stuttgart," symptoms "features," postmortem examination "post mortem" and an acute condition of the abdomen an "acute abdomen." Sometimes the sentences are awkwardly arranged as: "The risk is slight when the patient is strong, though poor when time has been wasted and the animal has become moribund." (!)